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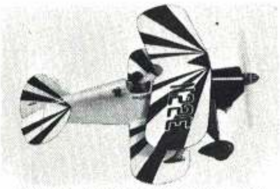
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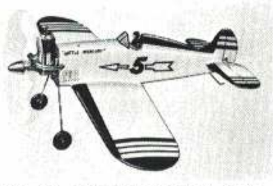
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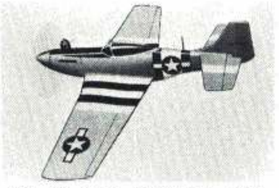
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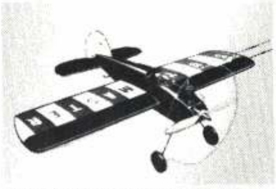
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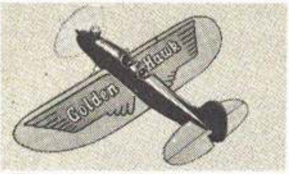

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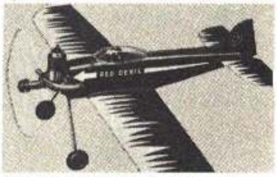

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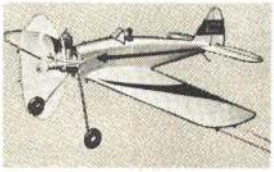

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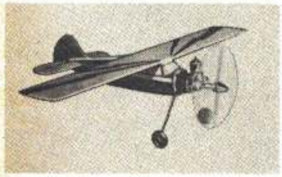

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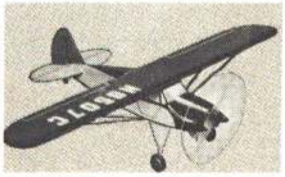

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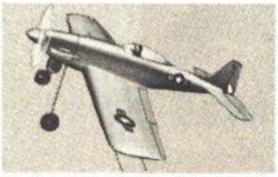

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VOLUME 76, NUMBER 8—AUGUST 1973

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This sleek Quarter Midget racer was photographed by Packard Photography of Burbank, California. Turn to page 20 for Don Panek's article on *Ole Tiger.*

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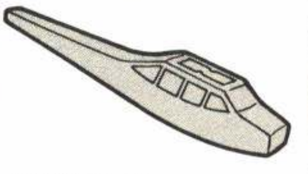

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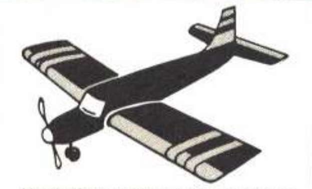

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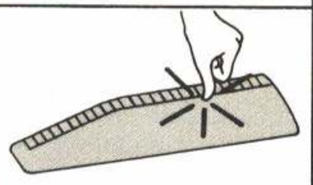

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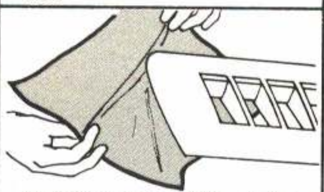

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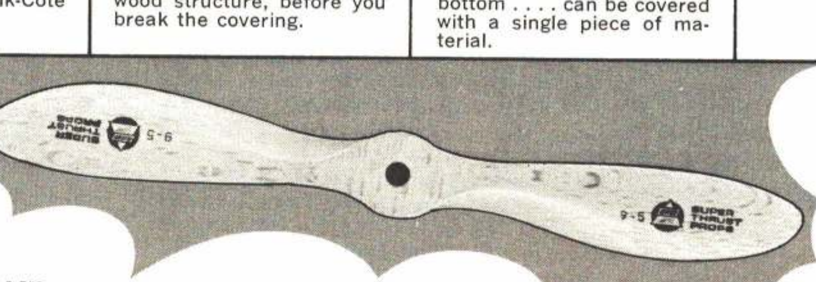

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GUEST EDITORIAL

A NEW WIVES' TALE

CAROL A. ZABRANSKY

Women unite with your husbands! Have you ever given any thought to what the model airplane hobby can do for a couple's relationship? Have you ever given any thought to why men devote so much of their spare time to modeling? I've found the answers to these questions. Within the past year, a new door has opened up to me. No more groping around trying to find *"my thing."*

Modeling doesn't have to mean just smelly old glue or dope and messy balsa shavings. There are many aspects to the hobby: research for scale planes, construction of a model, the thrill of a model's first flight, the experience of learning to fly and socializing with fellow enthusiasts. I enjoy all of these and better understand my husband because I've shared the hobby with him.

I got my first taste of RC last fall in a rather unannounced way. My husband Bruce was getting started in RC and just by chance we came across the AMA RC Glider Nationals which were held nearby at the George Miller Meadows. I stood stunned, mouth open, watching those beautiful, graceful, silent "birds" in flight. What an experience! I soon regained my composure and started asking questions. Some were pretty silly now that I think back, but Bruce, who either has an unbelievable amount of patience, or was just glad I was interested, answered every one of them.

Shortly afterward, we payed a visit to a local hobby shop where Bruce purchased a Schweizer 126D all styrofoam glider and a two-channel radio. He then presented them to me as a "Happy Whatever Day" gift. I was as proud as a peacock and as excited as a child on Christmas morning.

With Bruce's help and the model's easy construction, the glider was soon up in the air, along with my stomach. I also had a case of "Knocking Knees and Shaking Hands." *"Which way is left? What do you mean UP is back or down on the sticks?"* The first flight was a horror, but what an experience! I suppose Bruce shared the same feelings, because I noticed him go "white" a few times. But he still patted me on the back and said I had done well! He's a good liar.

I've had many flights and always thought my landings were pretty good, but you know how men are—they always find a few faults. Somehow I have earned a great reputation on my spot landings. Just because I've goofed a couple of times and buried Styro's (that's what I call my glider) nose in the ground doesn't mean I can't fly! At any rate, a lot of five-minute epoxy and some paint keeps Styro as good as new.

I'm not the only one who crashes. Bruce is good at it too. All fliers are taught that you can correct almost any flying error by quick reflex actions. Well, one gusty day as I was flying the model, it got a bit downwind and started heading for the ground behind a big clump of bushes which obscured my view. I did it, I mean I "let'er go and gave'er up!" I thought I'd lost Styro but gave full up elevator and all of a sudden I saw it shoot straight up from the other side of the bushes. As I saw it appear, I handed, no, I actually threw the transmitter to Bruce and try as he did to pull out of the stall, HE crashed my plane. The whole episode was so unbelievable that we stood there and laughed till we were in tears and then went out to inspect the damage. But best of all we were better friends than ever.

Good old Styro sure puts up with a lot. It's seen more ground in more unbelievable positions than you can imagine, but it's reliable—just keep the epoxy handy. It's now been nicknamed "Crater Face" or "Pimple Nose," *but it flies!* I must compliment its manufacturer for making a plane for me and all the other women that are learning to fly.

This has really been a fun-filled and educational year. I've done research and I learned to work with those very sharp X-acto blades (watch out for your thumbs, they always seem to get in the way) while building the Windward glider by Mark's Models, the Kadi glider by Hegi, a Gee Bee ½A racer from plans, and the latest, a Sig Citabria which has a detailed instrument panel and foam-padded leather seats. I've even tried my hand at building a Heathkit radio outfit with Bruce's help—he does the soldering because he doesn't trust me.

I've become a member of the AMA, feeling that I *need* their insurance protection—Bruce agrees completely. I say I'm trying, and he says, "Yes, very!" But since he became the President of the newly chartered Checkerboard Field R/C Club, he's learned that I can do some things. I'm the club's Secretary and with a club membership of 67 and still growing, I've got my hands full just seeing that the club paper work is kept up and all functions run smoothly. And I keep the house running the same way. It's a lot of work, but it is well worth it!

You see, having a hobby can have its advantages, especially when you share it with your husband and friends. Why not give it a try? "Try it, you just might like it." *I did and I do!*

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Modeler Mail

Delta Darts in California

Can you tell me where, in the Los Angeles area, the Delta Dart is available. I am working with a group of 11- to 14-year-old boys and I badly need something of this sort. The boys have many problems and few outlets. I have found in the past that airplane modeling is ideal to effect a change of attitude and challenge interest.

Eleanor Groves
320 N. Marengo Ave.
Alhambra, Calif.

Here is your chance, California. Is there a club in the area that can help with some assistance and a few Delta Darts?

—Editor

Variable pitch prop

Having read **AAM** for several years, I've noticed that no one—individual or manufacturer—has brought out a variable pitch prop. I speak of a prop that varies while airborne, not a pre-set affair.

Wouldn't such a prop be advantageous to the aircraft modeler? While slight weight increase in the nose might be a penalty, a lower pitch on landing approaches on RC aircraft would be desirable. Maybe engines that are critical on low rpm won't have to throttle back so far to slow down the aircraft.

Dennis Ladino
West Falmouth, Mass.

You're right, Dennis. At this time no one is manufacturing a variable pitch propeller. Perhaps your letter will induce someone to produce such a prop.

—Editor

Engine experts alert

I enjoy the new Racing section of **AAM** very much. John Smith is tops. However, my principle interest in writing this letter is to ask for help with an engine I acquired recently. The engine was manufactured by the Lucas and Smith Company. The model is Contestor Aircraft Engine D-60-R.

If anyone reading Modeler Mail can answer any of the following questions it would be of great help to me. (1) During what years was the engine manufactured? (2) Is company still around today and if so, what is address? (3) Engine is ignition—what are wiring and starting procedures? (4) Anyone have any spare parts for sale? (5) Any other information that may be of help? (6) Current value of engine? (Please, no offers—I plan to keep engine.)

I plan to restore engine to running condition and need above information to do so. All replies will be answered.

George T. Mattei
105 Franklin Rd.
Hamden, Conn. 06517

Canadian sources

I am a Canadian modeler who's built and flown many CL models and lately about five FF models. I've always enjoyed watching my friends flying RC planes and I wished I could do the same. But one thing always stopped me: money.

I am hoping that you can help me find an RC outfit that is both reliable and reasonable. There just doesn't seem to be much in Canada. I've looked everywhere, and now I'm turning to your magazine. I know that if anyone can help me, it's got to be you!

Richard Scholz
150 E. 16th, Apt. 309
Vancouver, B.C., Canada

Antique list

I am a member of the Model Museum Flying Club of Colorado. We have no regular newsletter at present, but we do have a current listing of Colorado Antique Model Airplanes. If anyone is interested in our list, please write.

Rolf O. Norstog
11285 W. Kentucky Dr.
Lakewood, Colo. 80220

Search for BIG FF planes

I am one of a number of people in my area who have the same problem. We all enjoy building and flying rubber scale models, mainly because of our limited budget, and neighbors with limited tempers who hate the noise. Other reasons are what you might expect—no gas, no noise and, of course, lots of fun. However, it seems that there are not enough companies manufacturing the BIG planes. Sure, the small ones are fine, but a bigger plane is more of a challenge. Anyway, a bigger plane has more class and looks even more realistic than what we now have.

If anyone knows of rubber scale (or semi-scale) planes with 34-in. or more wingspan, please write me.

John Kelly
1239 Schenectady Ave.
Brooklyn, N.Y. 11203

We know of a few manufacturers who have some large rubber-powered scale FF models. Sig has a couple in one-in. scale. Guillow has big WW II models with 30- to 34-in. wingspans. The Comet 3500 series consists of six scale models, 30- to 54-in. wingspans.

—Editor

Praise for Patricia Groves

I am writing in regard to the recent article in the April issue of **American Aircraft Modeler.** The story about the Lockheed Sirius by Patricia T. Groves, in my opinion, was excellent. Her researching skill is very good!

The Sirius and the Vega were very similar in shape, but I did not know they were from the same mold! Her researching ability in finding small details is outstanding, for example why the first Lockheed Explorer crashed and did not burst into a ball of fire. Although she skimmed lightly over the most important figure in her write-up, Charles Lindbergh, she manages to give one an understanding of his background. I hope she will write more for your magazine.

Thomas McCall
San Jose, Calif.

CL safety thongs a must

I found Al Rabe's column in the June issue of **AAM**, concerning the required use of safety thongs, to be full of fallacies and poor thinking.

Anyone knows that a "lightly constructed" (73 oz.) "slow flying" (55 mph at best) Stunt plane is a force to be reckoned with, particularly if it hits something.

His main argument is that it is a needless nuisance to the experienced flier. I don't know what type of handle he flies with, but it takes me a grand total of five seconds to slip my hand through my safety thong and snug it up, as opposed to just picking up the handle and flying. (This five-sec. figure was not arrived at by exhaustive testing by qualified MIT researchers, but merely by my wife using two different stopwatches.)

I really can't see anything wrong with the CLCB trying to get *all* Control Line fliers to use a safety thong. True, it is highly improbable that an experienced flier will ever turn loose his handle for any reason, but what about the novice?

A beginner starts out by watching an experienced flier. If that experienced flier swears by a safety thong (not at it!), the beginner will more than likely use one also.

Ever see a beginner get dizzy or get a good jolt of static electricity and turn loose of the handle? It's a sight to chill the blood.

If a safety thong keeps *one* person from being seriously injured or even killed by a model airplane, isn't the trouble worth it?

James Pescetto
Kansas City, Mo.

Teen section

I have read several of your past issues of **AAM** and I think it is just great, but I would like to know why you do not have a column for kids my age and younger (I'm 15). You could call it "Teen Modeler" or the "Kids Corner." I realize that this may seem like an odd request but the column could be written by and for kids.

Barry Newman
Monsey, N.Y.

CARL GOLDBERG

BOB VIOLETT LARRY LEONARD DON DEWEY JOE BRIDI KENT NOGY

DJ's MULTI-STRIPE

Ever hear of those names? Well, those famous modelers are all using the other name - DJ's Multi Stripe - because it works, like no other striping tape ever! It's very thin and has a special expensive adhesive - so it bonds permanently, and sticks like paint. There's no other tape like it! Final fuelproof bonding takes place in sunlight. No more shrinking, lifting, and getting dirty - problems that end up ruining the looks of a beautiful model. More and more leaders are using DJ's, so take their tip - try it, you'll like it, too. Exclusively marketed by Carl Goldberg Models.

Packard Photography

Kent Nogy and his World Record "Miss Dara" - 1 Min. 23.4 Sec. Super Poxy finish, with DJ's Gold Multi-Stripe edging major color trim.

5 COLORS - RED, WHITE, BLACK, GOLD, DARK BLUE

4 SIZES
1/16" Wide, 36 Feet Long - $1.98
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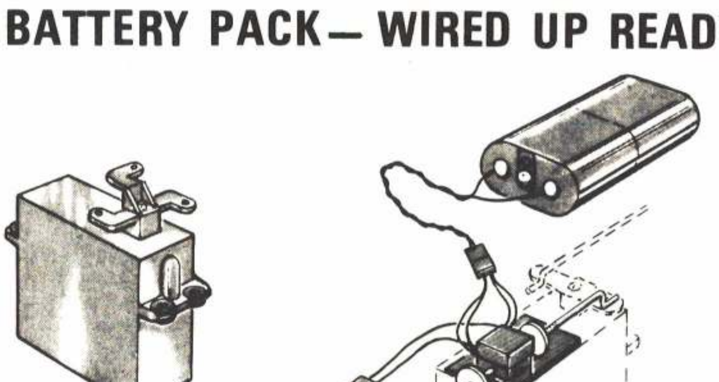

At last! A way for 4-Channel flyers to easily get into retracts. Our new power system is ready to go - just add 2 penlite cells, mount the trim-switch on your throttle servo, connect the retracts and that's it! When your throttle and trim levers are both moved all the way up or all the way down, your retracts will do the same! Servo has ample power, easily handles tri-gear operation.

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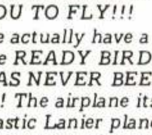
Ready Bird 23

$199⁰⁰

The READY BIRD 23 is an almost fully assembled Lanier airplane with an EK Products "Little Red Brick" 3 Channel digital proportional system FULLY INSTALLED, a Fox 25RC engine INSTALLED, and pushrods, wheels, fuel tank . . . EVERYTHING . . .FULLY INSTALLED AND ACTUALLY READY FOR YOU TO FLY!!!

We actually have a problem describing the READY BIRD 23 because THERE HAS NEVER BEEN ANYTHING LIKE IT! The airplane itself is a new 50" span plastic Lanier plane with a symmetrical airfoil wing that gives steady 3 channel handling characteristics even in wind, but retains enough stability to make the plane ideal for beginners. The READY BIRD 23 is designed for 3 channel operation (rudder, elevator, throttle) and your READY BIRD 23 comes with the excellent EK Products "Little Red Brick" 3 channel digital proportional INSTALLED. (You DO need to charge up the rechargeable airborne batteries — sorry about that!!)

The *Ready Bird 23* comes with a Fox 25 RC engine INSTALLED



The correct Sullivan fuel tank is INSTALLED, the pushrods to rudder, elevator, throttle and steerable nose wheel are INSTALLED, and the clevises are even pre-fitted to fit the elevator and rudder horns.

What we're trying to say is that READY BIRD 23 is READY TO FLY—it's NOT an ALMOST-ready-to-fly!

If you were to take the READY BIRD 23 out to the flying field here are the items you'd need that are NOT included in the kit as you receive it from us: Epoxy glue, Can of glow fuel, starting battery and glow plug clip, 9 volt dry cell for transmitter. EVERYTHING ELSE IS IN THE BOX.

HOBBY LOBBY 2 Digital Proportional

$79⁹⁵

A complete, ready-to-fly 2 channel digital proportional system with excellent range for demanding uses such as RC gliders, and with the built-in ruggedness that beginners need.

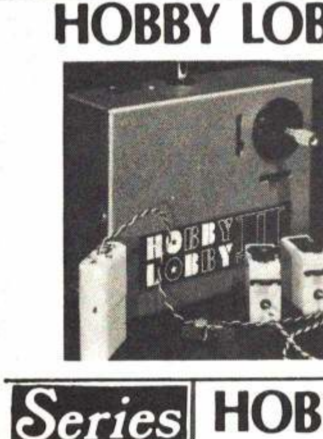
The SINGLE double-axis stick for rudder and elevator will make your transition to 4 and 5 channel control much easier than if you should get used to using your left hand for elevator on a cheaper 2-stick two channel outfit. Outfit includes; transmitter, receiver, 2-world engines S-5 servos (interchangeable with Blue Max Mark II systems), battery box and switch harness, 27 mhz. Outfit uses dry cells (not included). Add $6.50 for 72-75 mhz. band.

Series III

HOBBY LOBBY 5 Digital Proportional

RC Modeler Magazine said that this radio
". . . EQUALLED OR EXCEEDED SYSTEMS SELLING FOR TWICE THE PRICE."

$209.



if RCM's opinion sounds to you as if it's too good to be true, we want you to know that you can take a look at a Hobby Lobby 5 without risking a bit of money. Series III HOBBY LOBBY 5 is the only radio made that carries TWO guarantees: (1) Hobby Lobby's own guarantee says that when you order and receive our radio you can send it back to us for an immediate refund if you decide you don't like it. As far as we're concerned you can order a Hobby Lobby 5 just to take a look at it, and then send it back if you don't like it. (2) The manufacturer's guarantee covers any defects in material and workmanship that might occur within three months. Series III Hobby Lobby 5 is a complete 5 channel digital proportional system with transmitter, receiver, 4 servos, rechargeable n-cads and charger, and it's available on all 27, or 72-75 mhz. frequencies. Series III Hobby Lobby 5's are in stock now. Send us (or phone us) your order and we'll send you our radio. If you're still hesitant write us for our FREE BROCHURE.

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Blue Max 6 CHANNEL Digital Proportional SEMI KIT. . .

$168⁰⁰

with 4 FULLY ASSEMBLED SERVOS

The Blue Max SEMI KIT is still the least expensive way for you to acquire a multi-channel digital proportional system. Assembly is easy in that the tedious assembly of the small electronic components to the printed circuit boards has been done at the factory.

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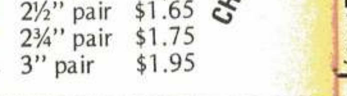

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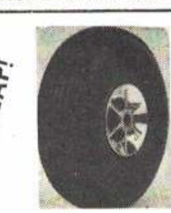

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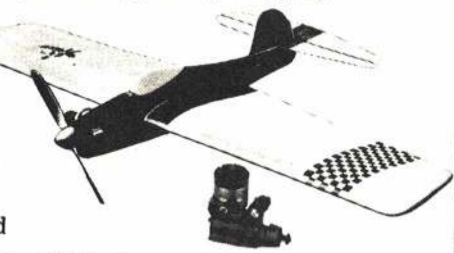
CONTROL LINE MATCHED COMBINATIONS

Sterling RINGMASTER
(Easy to build, profile, 30" span)



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$9.95

This consists of: FUEL TANK, CABLE-TYPE CONTROL LINES, HANDLE, BELL-CRANK, PROP, WHEELS, CONNECTORS, COLLARS, LEAD OUT WIRE to go with the airplane-engine combinations at left.

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Lanier SPRINT 25
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and
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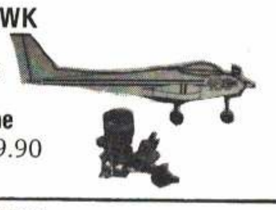

Midwest TRI-SQUIRE
and
McCoy 19RC Engine
Total list value $41.90
SALE **$29.00**

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Ace UPSTART ½ A Racer
34" span, hot 2 channel and
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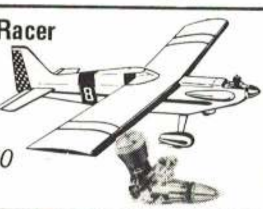

Ace 2T KIT
50" span, stable, 1 or 2 channel
and
Cox Golden Bee .049 Engine
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SALE **$17.00**

RCM BASIC TRAINER
50" span, 2,3, or 4 channels
and
McCoy 19 RC Engine
Total list value $50.90
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Bridi RCM TRAINER
and
K & B 40 R/C Engine
Total list value$81.95
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71" Span,
4 Channels and
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Du Bro "Whirlybird" HELICOPTER
and
K & B 40 RC Engine
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Ace ALL STAR Biplane
34" span, .049-.15 engine, 1 to 3 channel
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Cox Medallion .09 RC Engine
Total list value $38.15
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ACE HIGH Glider
70" span, 1 or 2 channels
and
Cox Babe Bee .049 Engine
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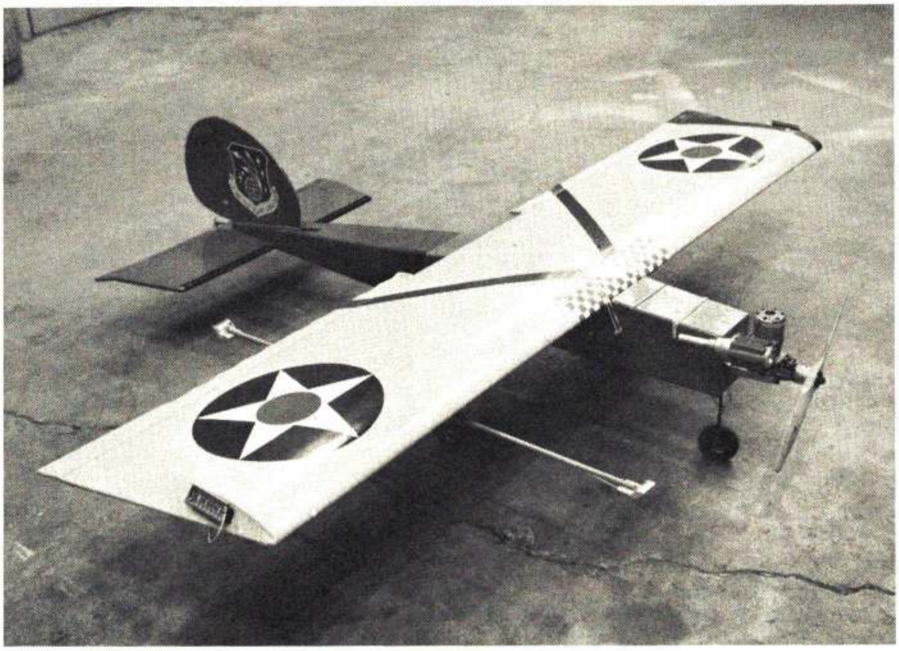
MODEL WORLD AUTOPILOT IN PROJECT



Above: An ordinary *Ugly Stik* has been a most useful project model. Here it carries sensors on wing tips and on boom. This plane has been flown at night with autopilot with complete safety. Right: Ron Van Putte's *Ascender* was used briefly to see if a pusher engine installation would eliminate the pitch control problems in the autopilot. Below: Much modified *Big Daddy* is flown on rudder and elevator with autopilot. It worked quite well, Ross 4 for power.

By now most of you must have read of Maynard Hill's phenomenal autopilot concept developed in the course of his work for the Applied Physics Lab of Johns Hopkins University. The concept has been well publicized by articles in the November '72 *Astronautics and Aeronautics* magazine and the *Flying Models* issue of February '73. The patented concept holds considerable promise for RC model use, drones, RPVs and aircraft.

For the uninitiated, an autopilot is a device used primarily to automatically hold the aircraft in a pretrimmed flight condition—normally straight and level. An autopilot can also be used as a flight control device with the pilot "in the loop." As we normally fly our craft, we command a proportional *control position* as a function of stick position; in other words this does not command an attitude automatically. When flying "through" an autopilot, an *aircraft attitude* may be commanded which is a far easier technique to learn for most people. Attitude command infers that as you move the stick to a position and hold it, this stick position is automatically translated into an attitude command by the autopilot. When the autopilot is trimmed for a hands-off straight and level flight condition, it always causes the aircraft to return to that condition after being disturbed by gusts, control inputs, etc. So if you command a bank or inverted flight and simply let go of the stick, the craft automatically returns to straight and level flight—*Magic!*

After a briefing by Maynard on his initial work with the electrostatic autopilot, we plunged in and built several autopilots and then ran flight tests on several aircraft. Autopilot fabrication and testing has been largely facilitated by the two indispensable individuals, Ron Wiensch of the Air Force Avionics Lab and Dennis Ingebretsen of the Air Force Deputy for Engineering.

For those of you who may not be familiar with the electrostatic autopilot, we will explain briefly. An autopilot is nothing new and has been used on aircraft for years. It normally employs the use of gyros to obtain the reference flight information, i.e., the gyro is stabilized in space and the aircraft moves around it. Any departure from a trimmed gyro/aircraft reference position is sensed and a command is sent to a servo to correct the error.

The principle difference between the gyro reference autopilot and the electrostatic autopilot is the technique used for obtaining an attitude reference. There is an electrostatic voltage field that surrounds the earth. Voltage potential measured at each altitude varies in a predictable manner and increases from the earth's surface to very high altitudes. The voltage measured at each elevation remains comparatively constant laterally

(Continued on page 85)

TELEPLANE

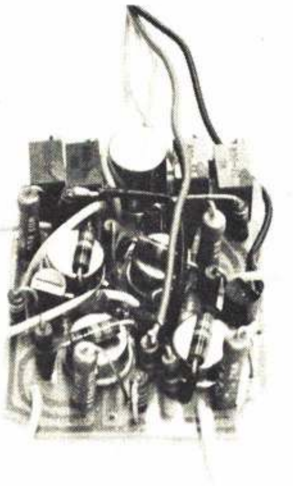
Maynard Hill's invention gave the project a tremendous boost. Flight safety, smoothness and quality are enhanced. / by Don Lowe

Above left: The *Sparrow* design developed by the project takes off. It will be autopilot flown at a later date. It is the type of plane the autopilot is ultimately intended for in the project missions. Above right: One of the project's early camera-carriers is this Ross 4 powered model called "BOB." Big rudder needed to damp out yaw oscillations.

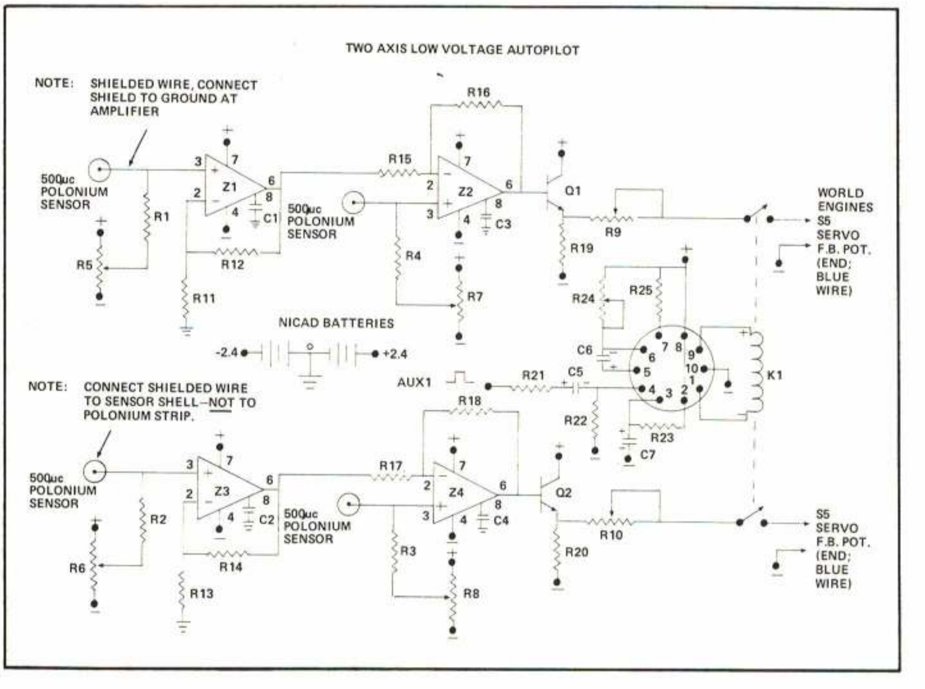
AUTOPILOT PARTS LIST

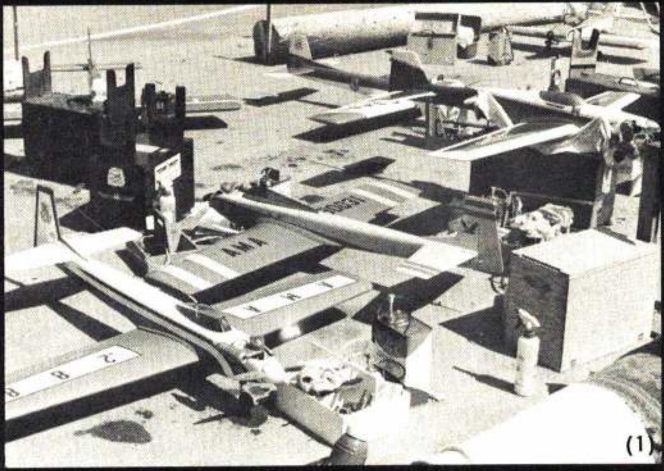
200-500 µc Polonium sensors; source Nuclear Products Co., 2519 N. Merced Ave., S. Elmonte, Calif.

C1 = 100 PS Disc 50V
C2 = 100 PS Disc 50V
C3 = 100 PS Disc 50V
C4 = 100 PS Disc 50V
C5 = 2.2mfd Tant. @ 15V
C6 = .47mfd Tant. @ 35V
C7 = 10mfd Tant. @ 20V
K1 = 432D-200 Teledyne Relay
R1 = 200meg 5% Victoreen
R2 = 200meg 5% Victoreen
R3 = 200meg 5% Victoreen
R4 = 200meg 5% Victoreen
R5 = 100K 10 turn
R6 = 100K 10 turn
R7 = 100K 10 turn
R8 = 100K 10 turn
R9 = 10K 10 turn
R10 = 10K 10 turn
R11 = 10K ¼ watt carbon 5%
R12 = 10K ¼ watt carbon 5%
R13 = 10K ¼ watt carbon 5%
R14 = 10K ¼ watt carbon 5%
R15 = 10K ¼ watt carbon 5%
R16 = 10K ¼ watt carbon 5%
R17 = 10K ¼ watt carbon 5%
R18 = 10K ¼ watt carbon 5%
R19 = 4.7K ¼ watt carbon 5%
R20 = 4.7K ¼ watt carbon 5%
R21 = 22K ¼ watt carbon 5%
R22 = 47K ¼ watt carbon 5%
R23 = 47K ¼ watt carbon 5%
R24 = 10K 10 turn
R25 = 47K ¼ watt carbon 5%
Q1 = MPS 2924
Q2 = MPS 2924
Z1 = LM308H
Z2 = LM308H
Z3 = LM308H
Z4 = LM308H
Z5 = WE3141



Above: Close-up of one early example of the two-axis autopilot developed at Wright Patterson by the project. This is a 4.8 volt unit that operates directly from the RC equipment's battery. Very compact. A forthcoming issue will present a construction article on it. Left: This is the circuit used in the autopilot. It shows how it works and can be built and flown successfully, but much more work and development has been done since this circuit was used. A circuit suited for model planes and sport fliers will be seen in a later issue.


TWO AXIS LOW VOLTAGE AUTOPILOT
NOTE: SHIELDED WIRE, CONNECT SHIELD TO GROUND AT AMPLIFIER
500µc POLONIUM SENSOR
R1
R5
Z1
C1
R12
R11
500µc POLONIUM SENSOR
R15
R16
Z2
C3
R4
R7
Q1
R9
R19
R24
R25
WORLD ENGINES S5 SERVO F.B. POT. (END; BLUE WIRE)
NICAD BATTERIES
-2.4
+2.4
C6
K1
AUX1
R21
C5
R18
R22
R23
C7
NOTE: CONNECT SHIELDED WIRE TO SENSOR SHELL—NOT TO POLONIUM STRIP.
500µc POLONIUM SENSOR
R2
R6
Z3
C2
R14
R13
500µc POLONIUM SENSOR
R17
Z4
C4
R3
R8
Q2
R10
R20
S5 SERVO F.B. POT. (END; BLUE WIRE)


(1)

(2)

ON THE SCENE

BIRDS OPEN PATTERN MEET

BILL SIMPSON

The first sanctioned Pattern contest in Southern California this year was the BIRDS Open, held March 24-25 at BIRD Field in Carson. Rain, rain and more rain might be a fitting description of the Southern California weather this winter, but we were fortunately blessed with Indian summer weather with clear skies and temperatures in the 70s.

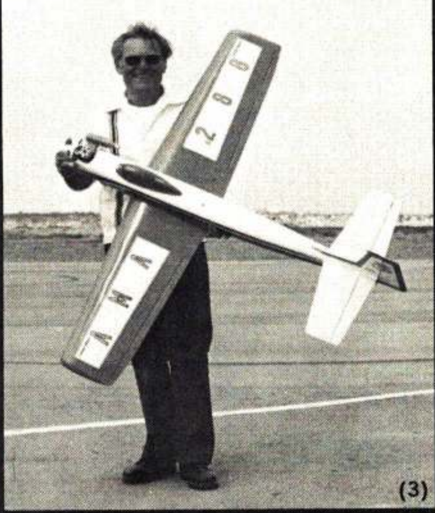
There was a sad note as word spread of the death of Bill Gast, the president of the Ventura Comets. Bill was killed in an automobile accident the previous Tuesday, and as his funeral was March 24, only a few Ventura Comets showed up to fly.

There were 45 entries. Five rounds were flown on Saturday and two on Sunday of a shortened pattern and then the first five finishers in each class had a two round fly-off of the complete pattern. The maximum allowed time for the shortened pattern was six minutes in Class A and B and eight minutes in Class C. The time began when the previous contestant turned off his transmitter, so engine starting was included in the flight time.

There were three flight lines and a card with the order of contestants posted on each line. There was no paging of contestants over the public address. If you were not there when your turn came, you were passed for that round and the next contestant moved up.

The BIRDS Contest Director, Tom Melsheimer, did an excellent job keeping things moving. The speeded up schedule was appreciated by the con-

(Continued on page 71)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(1) The pit area was crowded! (2) Class A winner Dennis Breene fires up the Super Cuda with his dad, Frank, assisting. (3) On his home court, Mr. Smooth himself, Joe Bridi, flew the then brand-new Super Kaos to first place in Class C and for overall Championship. He used Rom-Air retracts, S&O radio, Super-Poxy paint and a Lee-Veco engine. (4) No one can hold a Pattern meet without the ladies help. Registration was handled expertly by Betty Stream and Marian Helpen. (5) Jim Oddino, the "O" in S&O radios, taxies his Super Cuda out for a flight. Fuel problems kept him out of contention. (6) The judges, bless their hearts. You'll note that sunny and warm California—wasn't.

(4)

(5)

(6)

Du-Bro "HUGHES 300" semi-scale, R/C HELICOPTER

RADIO CONTROLLED MODEL HELICOPTER KIT

COMPLETE O & R 1.34 CU. IN. GLO FUEL ENGINE, GEAR BOX, AND INERTIA CLUTCH . . . ENTIRE UNIT READY TO BOLT ON

SPECIFICATIONS H-300

OVER ALL DIMENSIONS
LENGTH 59½″ . . . WIDTH OF MACHINE AT SKIDS 16″ . . . WIDTH OF PASSENGER COMPARTMENT 8″ . . . HEIGHT 22½″.

PREFORMED PARTS
PASSENGER SEATS . . . INSTRUMENT CONSOLE . . . MANY STEEL, ALUMINUM AND BRASS COMPONENTS ALL CAREFULLY MACHINED OR PRE-FORMED, READY TO BOLT TOGETHER . . . CLEAR PLASTIC CANOPY . . . ONE PIECE AIRCRAFT PLYWOOD SIDE FRAMES FOR THE FUSELAGE UNIT.

ENGINE
O & R 1 34 CUBIC INCH DISPLACEMENT . . . CUSTOMIZED FOR GLO FUEL BY DU-BRO PRODUCTS . . . SPECIAL R/C CARBURETOR DESIGNED AND MANUFACTURED BY DU-BRO PRODUCTS . . . USES REGULAR R/C GLO PLUGS . . . PULL STARTER BUILT IN . . . GEAR BOX AND CLUTCH ARE ALL ONE UNIT, READY TO BOLT IN PLACE . . . FUEL TANK SUSPENSION BRACKETS ARE DESIGNED TO CARRY A SULLIVAN 12 OZ. SS12 PLASTIC TANK (INSTALLATION OF LARGER TANKS EASY TO DO BY THE INDIVIDUAL OWNER.)

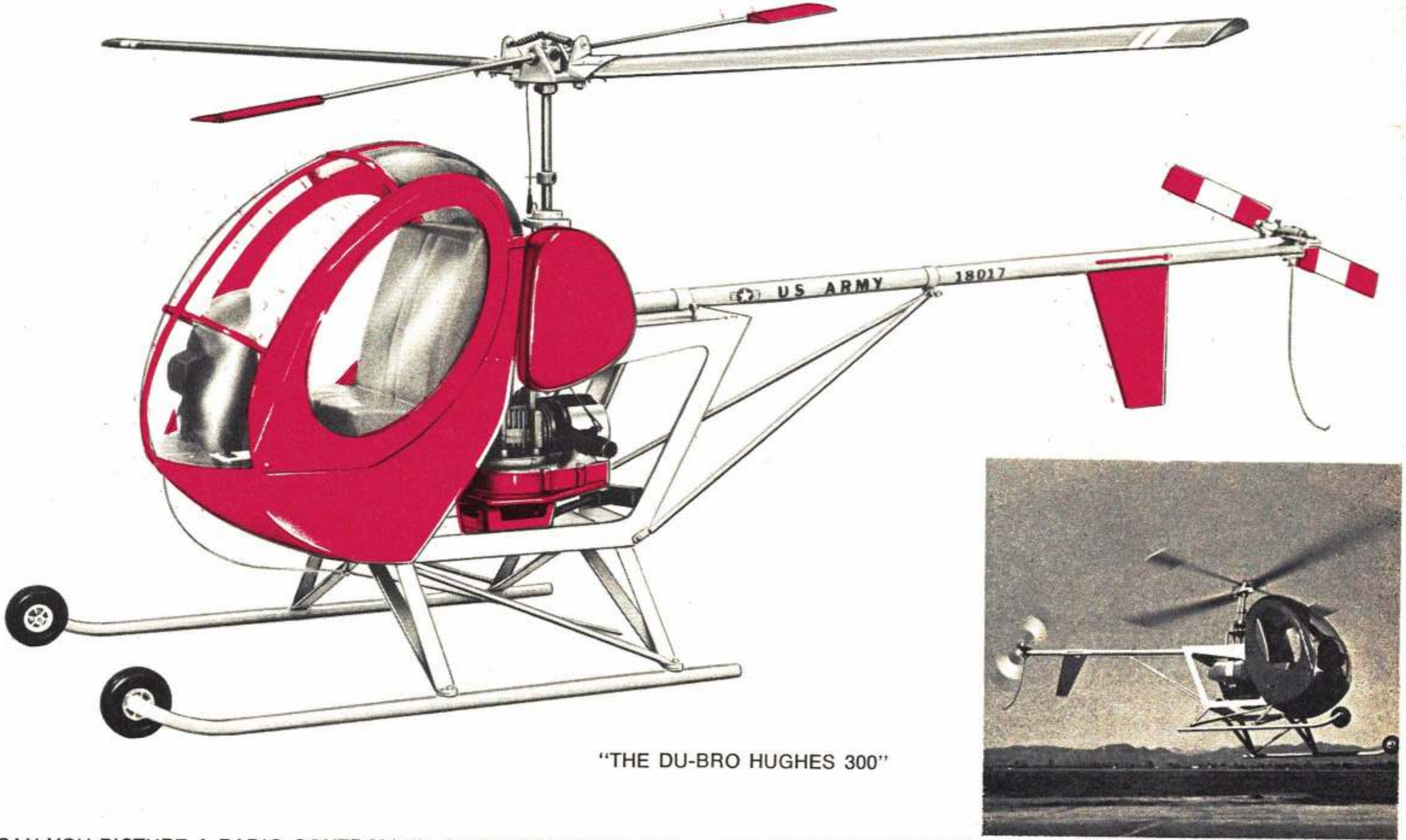
MAIN ROTOR (SHAPED)
BASS WOOD . . . SPAN 57¼″ . . . CHORD 2″ . . . AIRFOIL, HIGH LIFT SECTION . . . HILLER TYPE SEMI-RIGID ROTOR.

TAIL ROTOR (SHAPED)
BASS WOOD . . . DIAMETER 12½″ . . . CHORD 1 3/16″

FLY BAR
STEEL ROD . . . SPAN 28½″ FLY BAR WEIGHTS, EXTRUDED ALUMINUM, AIR FOIL SECTION.

WEIGHT
FLYING WEIGHT WITH FULL TANK APPROX. 14 POUNDS.

PERFORMANCE DATA
TOP SPEED FORWARD ESTIMATED AT 70 MPH . . . PROPERLY TRIMMED, WILL FLY HANDS OFF . . . ALTITUDE, OUT OF SIGHT . . . CLIMBING STALLED TURNS . . . STEADY HOVERING . . . EXCELLENT CONTROL ON VERTICAL RISE OR DESCENT 360° TURNS HOVERING OVER ONE SPOT . . . FLIES FORWARD, BACKWARD OR SIDEWAYS . . . HAS BEEN FLOWN WELL IN 40 MPH WIND GUSTS.



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Uplift

27th ANNUAL TORREY PINES GLIDER GATHERING

Fantastic flying site and friendships built on cooperation between model and full-size glider pilots. The key is SAFETY. / by Paul F. Denson

The Associated Glider Clubs of Southern California sponsored a soaring pentathalon April 14-15, the 27th Annual Torrey Pines Meet, consisting of five events: Distance, Altitude, Duration, Bomb Drop and Spot Landing for full-size gliders. This meet in itself was not particularly earth shattering to the modeling fraternity, but the story behind the last two of these 27 annual events shows how to go about cementing friendships and making flying, both model and full-size, more fun and *safer.*

Over two years ago both the AGCSC and the Torrey Pines Gulls discovered that if they were both to continue flying at the Torrey Pines Gliderport, something would have to be done, and done fast. A meeting of both governing bodies was called, and out of this meeting has come an extremely valuable relationship to all concerned.

In 1971 the Torrey Pines Gulls R/C Soaring Club became an associated club of AGCSC and the two clubs have been working closely together to promote the safety of all pilots, planes and spectators at Torrey Pines. AGCSC was organized in 1929 and, from the standpoint of continuous operation, is one of the oldest gliding groups in the United States. Since AGCSC has a lease on the Torrey Pines Gliderport area, it was in the best interest of TPG to get the blessings of the full-size glider group in order to keep our present flying location. At first it was thought by TPG that we would cease to fly whenever the full-size gliders were in the air. Then, to our surprise, it was discovered that they wanted us around when they flew to control the non-Gulls who flew at Torrey. If a compatible pattern could be established, it was perfectly logical that there could be simultaneous flying. Since AGCSC had control of the site, they could delegate control of the cliff edge to TPG and the Gulls could police activities there making the air safer for the full-size gliders. This called for certain flying procedures to be established, the rules of which were reviewed and passed by both clubs then posted at the cliff edge for Gulls and other RC fliers to follow for maximum safety.

By and large, the majority of the flying at Torrey is done by the RC gliders. The weather is such that the models can fly year-round; rarely is the lift insufficient for the RC models to fly. In fact, many businessmen bring their gliders out and fly during lunchtime—a wonderful way to get exercise, see the beautiful vista and fill your lungs with fresh air.

When the models fly they attract many spectators. Since the cliff edge overlooks the broad Pacific, it is natural for people to throw a picnic lunch in the car and go out to Torrey to watch for whales (in season), watch the full-size gliders fly, or watch the RC gliders go through their acrobatics in the perpetual lift of Torrey Pines.

The Torrey Pines Gulls' responsibilities do not end with making conditions safe on the cliff edge for full-size planes, RC pilots and their planes and

(Continued on page 104)

(1) Harry Baldwin, President of the Association, checks operation of release hook in his Schweizer 1-26. Purple trim color on his glider is very attractive and the plane is called "Statutory Grape" as a result! (2) What goes on here needs explanation. Walt Mooney AAM columnist for FF Scale, is about to take Kathy Kelly, an American Airlines stewardess, (she's the event queen and she's beautiful!) for some independent soaring. (3) The Windfree of Jim Haldy rises from launch winch for a two-min. duration and spot landing demo. Edge of runway is top of a beautiful 300-ft. cliff overlooking the Pacific Ocean. It gives year-round slope lift for all gliders. (4) Torrey Pines site is a city-operated park. It functions as a full-time, full-size gliderport as well as glider site. (5) The Bubble Dancer by Randy Warner is launched for a model duration demonstration. (6) Static display of model sailplanes. (7) Frequency control board includes safety regulations for compatible flying with model and full-size gliders in the air simultaneously. (8) Even fledgling Gulls got to fly. A Junior member Dan Neeley releases his original design for a duration flight. (9) Jim Haldy, Contest Director of the Gulls, examines the cockpit of a glider built from a BIG kit—it is called a Duster.

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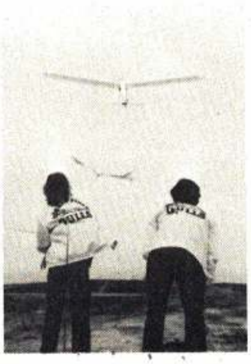
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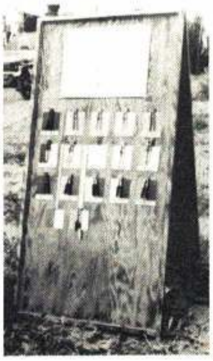
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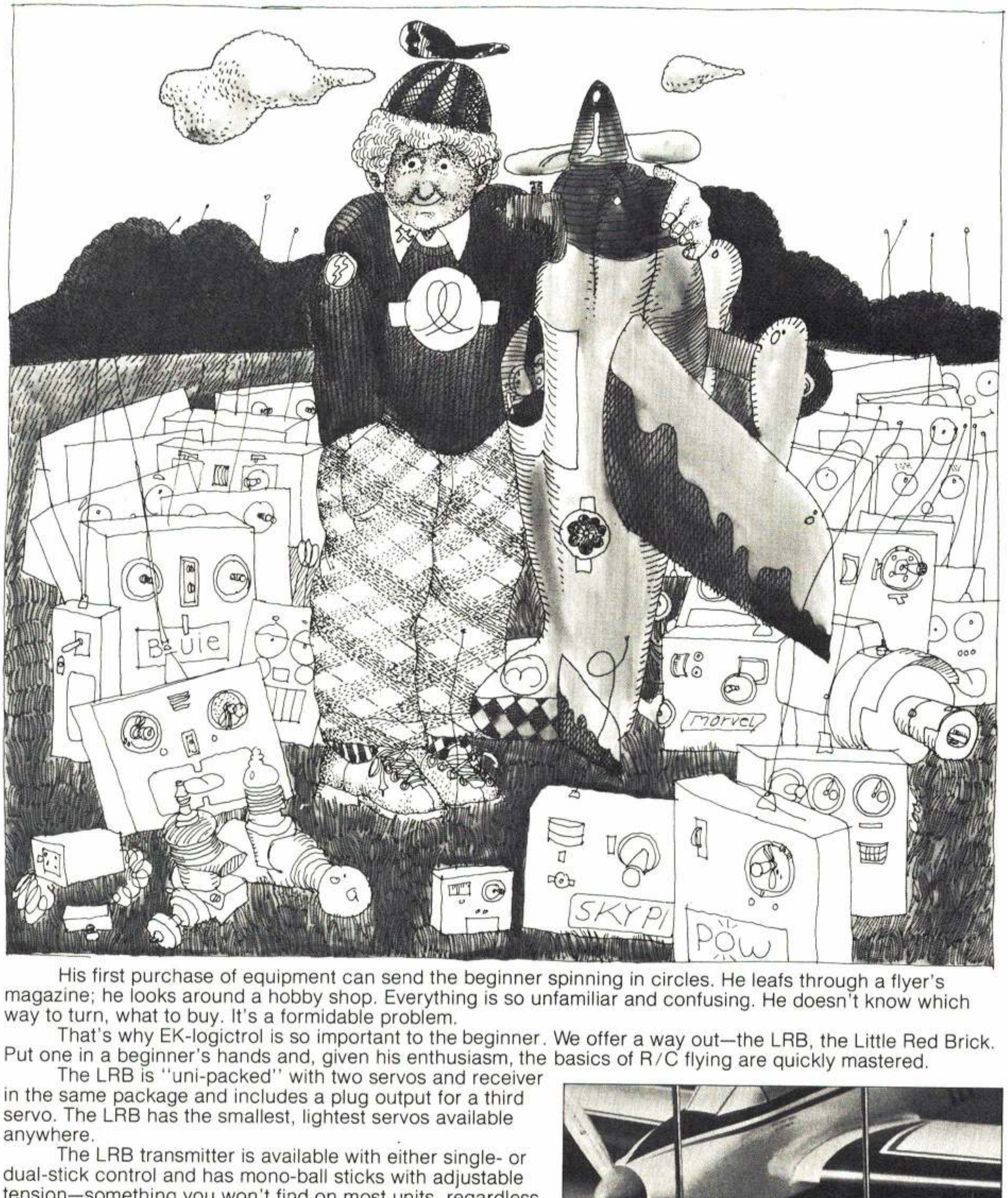
The classic dilemma of the starry-eyed beginner.



His first purchase of equipment can send the beginner spinning in circles. He leafs through a flyer's magazine; he looks around a hobby shop. Everything is so unfamiliar and confusing. He doesn't know which way to turn, what to buy. It's a formidable problem.

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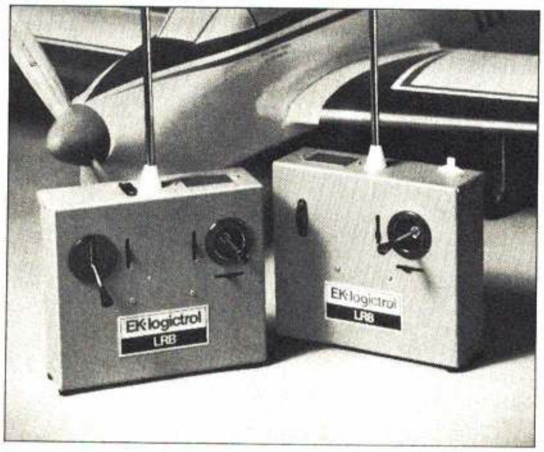

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JOHN SMITH ON CL

The Postman Cometh: Each month I receive letters from readers which contain ideas, comments, news of other clubs, etc. Most do not need a reply, but some I answer directly. This month one came that I feel deserves publication, in part. The writer flew Speed in the Fifties and then, after an absence of many years, started again in 1970. His comments follow, along with some of mine.

"I think the following comments on Speed events should be considered.

(1) "Less talk about rule and engine size changes. I was ready to buy a $200 to $250 60 until all the talk about dropping C size to eliminate the 60 to 65s. How can Speed fliers get ready if people keep changing (or talk of changing) rules?"

Comments: The only changes in Speed flying over the years have been in line sizes (unless you want to count the dropping of six classes of Speed to four, way back when.) The same airplanes are being flown today as were used many years ago, with the exception of some new designs with piped engines. Airplane design is not layed down in the rule book, it is a very flexible thing, the designer/flier is given a completely free rein as to size, shape, area, etc. Engine development over the past years, much of it being done by the *dedicated* modeler, rather than the manufacturer, is where the difference is between the winner's circle and the also-rans. Changing the rules will not make losers out of winners or vice versa. If you know what you are doing, and do it well, you'll be winning more than you'll be losing.

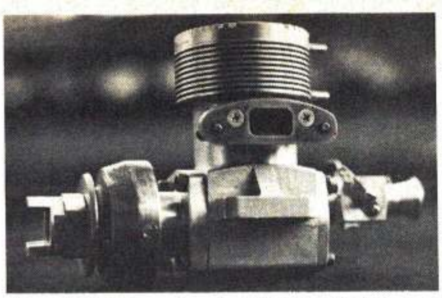
(2) "Less comments about 'very dangerous' 65s. Comments of this nature frighten parents away from the entire hobby."

Comments: My own feelings are that 65s are dangerous. For that matter so are the 29s and 15s if flown in a "so-what-do-I-care-I'm-in-the-center-of-the-circle" attitude. Any time you get hit with a one to three lb. object traveling at up to 190 mph, I'm sure it would leave more than a sore spot! Personally, I've only had the experience (?) of seeing about a half dozen Speed models come off the wire while traveling at top end. The first was in 1946 when a Hornet powered (60) model traveling at about 120 mph came unglued, traveled at least 1000 feet and went through the steel top of a new Chevy. At Olathe NAS at the '68 NATS a C Model traveling over 180 came off and went about three circles away and cut the leg off a steel chair like it was butter. I hate to think what it would have done to someone standing there.

One more. In Dayton a couple of year ago, a noted Speed flier got hung up on a pylon bolt. With the model traveling near 200 mph it went out of control, but never left the line. The circles, by the way, are fenced with six to eight ft. heavy chain link, but 75 ft. away, everyone, and I mean *everyone* in the pits was on his belly trying to make himself the smallest possible target in case something came apart. The above mentioned models were flown by what I call "professional type" Speed fliers, people who know what they are doing. The airplanes that came off were processed, (pull tested) as per the rules but still were very dangerous in the situations shown. Every Speed model, from 1/2A up to the 60s should be treated as such and our safety record will continue to be as good as it is.

(3) "People should stop trying to create classes to attract fliers. Equipment should become obsolete by technical development and not by rule changes . . . ."

Comments: The "new classes" that are being suggested and flown in many areas are attracting new fliers—1/2A Mouse Racing, Slow Rat, 1/2A Team Racing, to name a few. It is only logical to believe that a large percentage of the fliers will "graduate" to our more specialized events—FAI Team Race, Fast Rat, Goodyear, etc.—when they gain the experience. Don't knock any event that helps our sport grow. 40 class engines are where most of the development in new equipment lies today, thanks to RC Pylon racing. When the equipment is available, and most of it is very good, why not take advantage of it? 60 class is getting so "hairy" with the high pull of the model that many people can't really continue to handle the aircraft. It may die a natural death in a few years—in a way I hope not, because it is a very exciting event. The new suggested rule to allow proxy pilots in Open class should help extend the life of the event, but if speeds in C increase much more, no one will be able to hang on to them.



The SK-130R engine by Satoshi Kojima is a 1.30 cu. in. Schnuerle ported, tuned pipe racing engine for boats.

(4) Speed needs more publicity."

Comments: Part of the problem here is lack of contests carrying Speed as an event. There are only a handful of contests each year that run Speed. Some of them very informally. More, and better, contests are the answer here. Four or five area contests, Dayton, Los Angeles, Cleveland, New York and Huntsville probably draw 95% of all the Speed fliers in the country. Promote Speed as something more than a novelty event and you'll have them, and spectators, coming out of the woodwork.

(5) "More consideration of others trying to get started in Speed from the 'regulars' . . . Share your equipment."

Comments: Anyone who flies any event should come prepared having equipment, props, fuel, batteries, lines, etc. Many clubs do share some starters, and most everyone I know will give advice, help, and suggestions to new Speed fliers. But I don't think anyone should be expected to furnish props, fuel, lines, etc. It is expensive enough to keep your own tool box equipped, let alone carry parts for the competition.

(6) "In the interest of (7), reduce the number of trophies for Open class—maybe first place only. It is the competition that really counts for Opens"

Comments: Many feel this way, but if awards were dropped for Open fliers, the contestant list may drop too. Memories are nice, but you remember trophies longer.

(7) Have all Speed events separated for Juniors. It is very discouraging for Juniors to have to compete with Seniors and Opens."

Comments: Being a member of an organization which runs a couple of large contests each year, we have class breakdowns for Juniors. But many contests do not have the funds to operate this way. Many small meets only draw two to three Juniors per Speed event. It's hard to buy a $15.00 set of trophies for only an intake of $6 from the event.

(8) "Develop a separate class for unlimited technical developments flown under the strictest of conditions. It looks bad for the Russians to be going 245 mph."

Comments: It also looks bad for the Russians to be winning FAI Team Race each year, too. Also the Italians to be winning FAI Speed. When our world teams (FAI) get to Europe each year, they are running, for the most part, imported engines. In 1972 our FAI Team Race team picked up engines in Europe to run at the meet! Even without having experience with running the engines, they still did well. We need better equipment, more backing ($$$$), more team support (the Russians are government supported). Many of the FAI winners are pros in the truest sense of the word.

As for the 245 mph record, well, let me tell you friend, this, and all world record attempts, are open to anyone who tries to run them. All it takes is a World Record Sanction from AMA and anyone can have a fling at it. There are many models right now in someone's workshop capable of bettering the 245 mph record, and many others. For the last two years in Cleveland we have had sanctions for world record attempts at all our large meets and they were advertised as such in Competition Newsletters. Number of takers? Exactly ZIP. (For those who don't know, FAI world records are set with Speed models flown on shorter lines than AMA lines. For example, in 60 class in line length is 65 ft. with no minimum line diameter.) The last world record attempt that I remember was at the '58 NATS when Bob Lauderdale set a 60 record. If memory serves me, he flew in .011 lines. I think the record still stands.

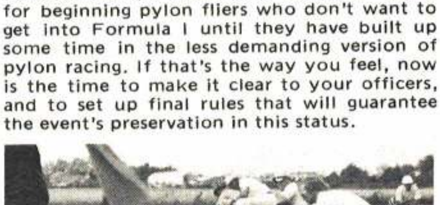
Well, sports fans, what do you think? Are we going downhill? Taking only the NATS as a sampling, Speed participation has increased in all classes along with Rat, Goodyear and Team Racing (FAI). But as in any competition event—horse racing, auto racing, model airplanes—it all boils down to one thing. The guys who work the hardest, have the best equipment—be it horses, cars, or model engines—will always be on top, regardless.

BOB STOCKWELL ON RC

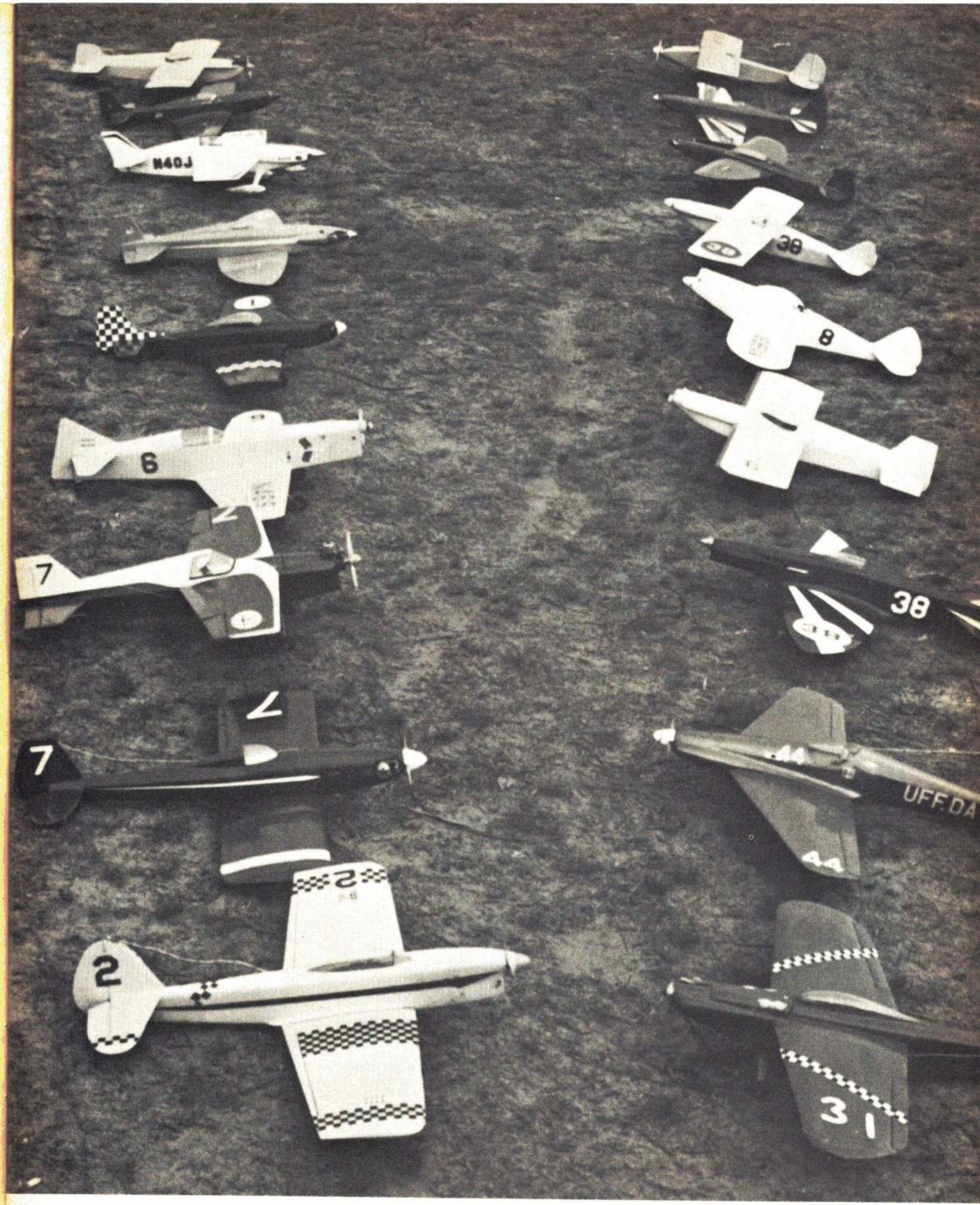
November Tournament: The NMPRA has really got it going this year! In addition to the AMA Nationals Champion in Formula I and FAI/Formula II, and the regular point-accumulation system of establishing overall Formula I and FAI/Formula II Champions on the basis of best seven races, and the various NMPRA District Championships, there will be a TOURNAMENT OF CHAMPIONS over the Thanksgiving holidays. It will take place this year in Los Angeles, at the flying site of most Southern California contests, a Marine Helicopter Station called Mile Square in the Fountain Valley, just a few miles from Disneyland. Next year it will be in Florida, and in 1975 it will take place in Corpus Christi, Texas. There will be four solid days of racing, November 22, 23, 24, 25. The top 20% from each district will be eligible to attend. All the pre-contest planning will be the responsibility of Chuck Smith, who is responsible for more improvements in contest management than just about everyone else put together.

If you're not an NMPRA member, and you fly at all on the Pylon circuit, let me urge you to join up and start qualifying for the Championship races in November. Win or lose, this is sure to be the most exciting and memorable event since the Las Vegas International Air Races of 1970. And because weather conditions are generally excellent for high nitro speeds in the Orange County area, I expect that if 1:20 is ever going to be broken, it will be broken by the time of the Tournament, because the competition will be stiffer and everyone will be flying right on the pylons. The new K&B production Schnuerles will have been out for four or five months by then, with lots of testing and experimentation behind them. Very probably the new Supertigre X-40 Schnuerles will also have been available for a few months, and who knows what improvements the RAF, the HP, and perhaps even other engines will have made by then? There is no way this can fail to be the fastest, most competitive, most enjoyable, and most exciting race in the history of model aviation. Mark your calendar now, save up your vacation money, plan to bring the family and dump them in Disneyland, and get to work qualifying for this event!

QM Event: The Quarter Midget event has now become a part of NMPRA also, with an organization parallel to that of the parent organization, with the expectation that it will be coming along as a regular AMA sanctioned national event. You QM racers who have felt excluded should now join the NMPRA and participate in rules finalization and in protecting your event from the kind of professionalism that I have heard many QM fliers object to with respect to Formula I. Most of us view the QM event as a "break-in" event for beginning pylon fliers who don't want to get into Formula I until they have built up some time in the less demanding version of pylon racing. If that's the way you feel, now is the time to make it clear to your officers, and to set up final rules that will guarantee the event's preservation in this status.



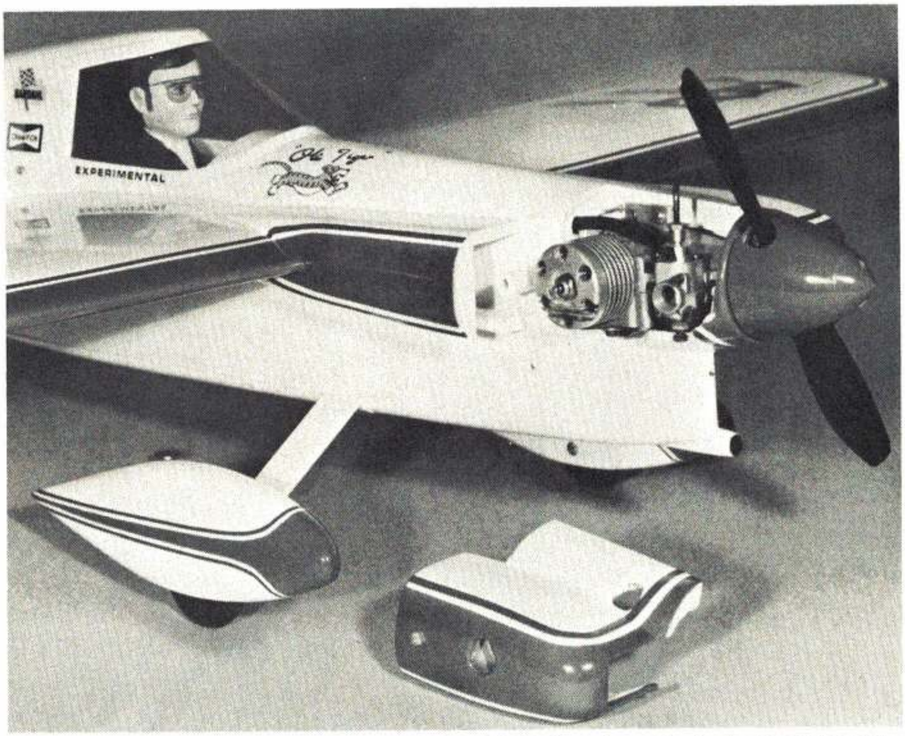
First off: Chuck Smith, who will organize details of 1st NMPRA Tournament of Champions, November 22-25, Mile Square, Calif.



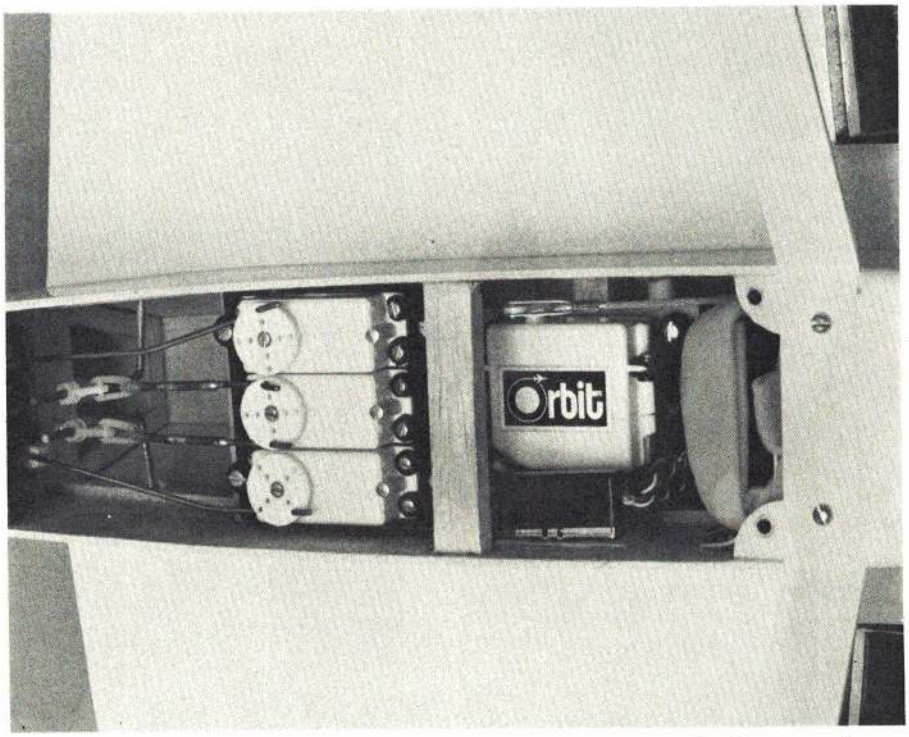
Nice to see that Quarter Midgets are so varied in design. Here's part of the entrants at a North Central Pylon League race. Photo from James L. Brown.

OLE TIGER

Q-Midgets are fun for Racing, Sport flying, and Stand-off Scale. Ole Tiger features the House of Balsa wing for quick and true construction. / by Don Panek



The ST-powered version is the original model. A K&B Schnuerle version is shown on the plans. Remember, Q-Midgets must have a stable engine idle, so you can land under power if desired.



All equipment access is through the bell hatch; it is a one-piece plane. Use those aervo trays—they provide the best vibration and crash protection.

Having the desire to race and compete is an instinct born in every individual and almost every modeler who has ever watched Formula I or FAI contest. I personally started with an interest in Formula I, but as the years passed by, the event overwhelmed me due to the great amount of time and money required to compete on a near or equal basis.

Recently, the Quarter Midget event has come into its own, and with it a chance for everyone to compete in a racing event without the necessity of devoting all of his resources to only one phase of this great hobby.

Club contest schedules are now including the Quarter Midget event across the country and if you're looking for a model capable of competing successfully, plus a sleek appearance, "Ole Tiger" is for you.

The design meets all existing rules plus those presented to the AMA contest board, which were outlined at the Toledo (Ohio) Quarter Midget meeting in February.

Construction has been simplified by using a unique wing design concept utilizing two fiberglass arrow shafts for both structural strength and as the wing building jig. The credit for this concept goes to Don Dombrowski, owner of the House of Balsa, 2814 E. 56th Way, Long Beach, Calif. 90805, who offers the wing kit, complete with shafts, sheeting, die-cut ribs and formed wire aileron linkage for $11.95.

Construction

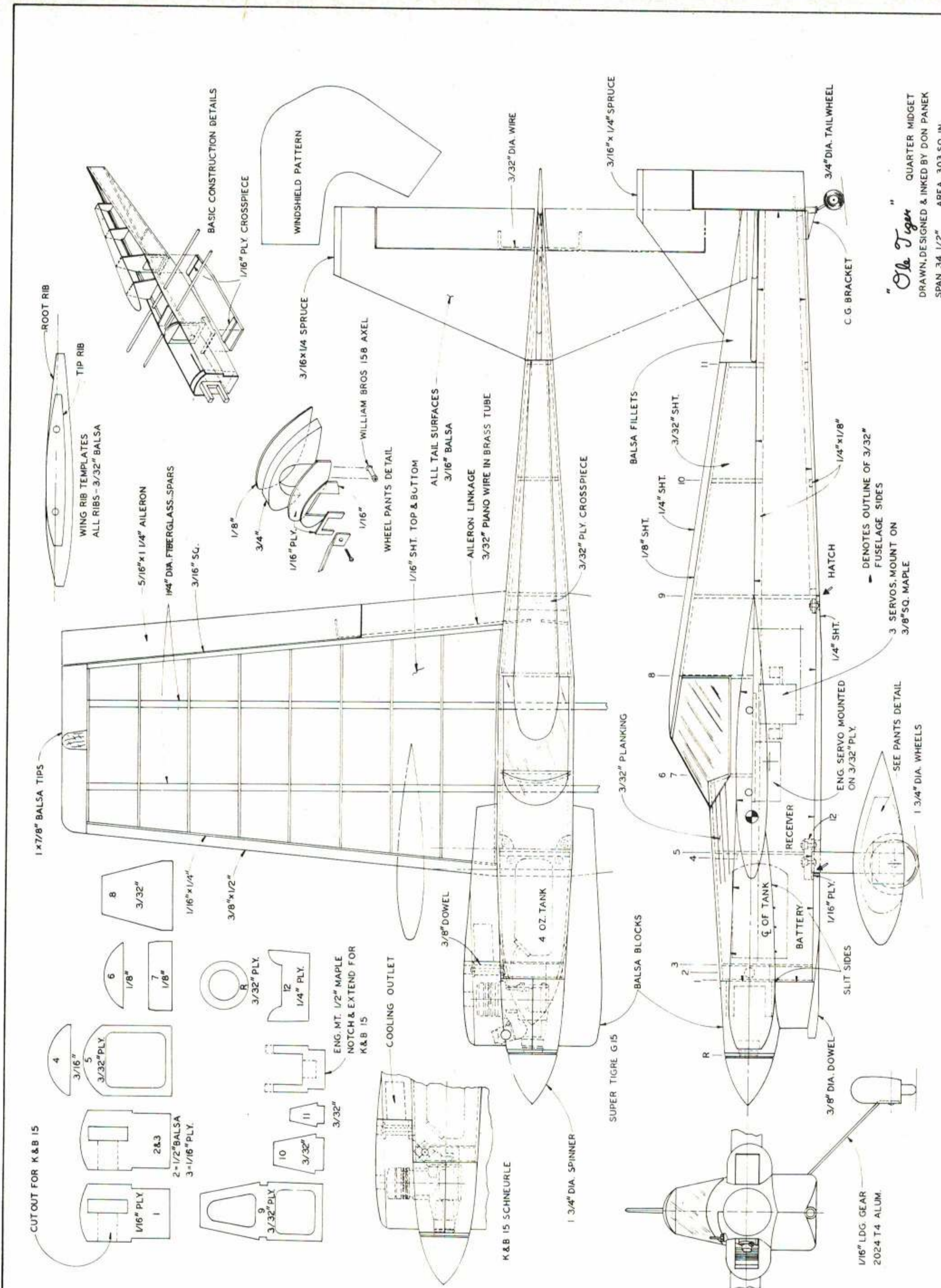
I personally like to cut all parts out prior to beginning a project. Once completed, the fun of assembling begins. The wing ribs are made by stacking nine pieces of 3/32" balsa cut to lengths noted on plans, placing them between a root and tip 1/16" plywood rib template. Drill the two 1/4" dia. holes, bolt the stack together and sand to shape. Repeat for the other side of the wing by reversing the tip and root template. Be sure to mark ribs with a felt tip or ball point pen to denote top and front to avoid confusion during assembly.

Two engine installations are shown, one for the Supertigre 15, and the other for the new K&B 15 rear rotor. If you plan to use the K&B 15, cut the engine mount to the longer configuration and notch out the section noted to clear the rear of the engine case.

At this time, drill mounting holes, using plans for proper placement of engine. Sheet metal screws or blind nuts can be used to hold engine in place.

The firewall assembly, consisting of bulkheads 1, 2 and 3, is cut out to the shape noted. Epoxy together with the engine mount in place. The mount will align the assembly, but make sure mount is at right angles to firewall surface, to assure a zero thrust line.

(Continued on page 92)



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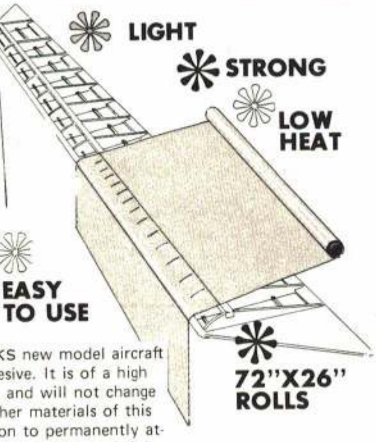
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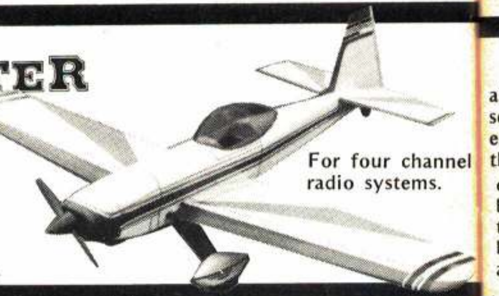
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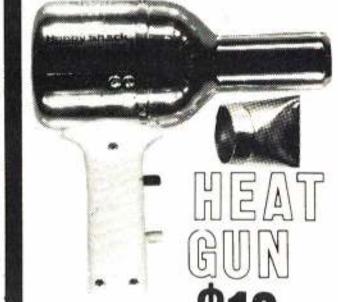

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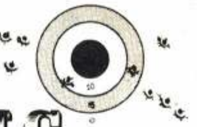

FOR UNDER 12 BUCKS?

Recently we took the inititive and worked day and night on research (we flew all over the world) trying desperately to locate . . . THE REAL THING, only to find out that they have all been destroyed. Although the factory that built them still has the original drawings, . . . they are classified as Top Secret! But with a little persuasion *?¶¢#%!!!$@‡•†"**!!!, . . . we obtained an almost-sort of-genuine drawing. We were flabergasted to find out that the bunge rubber normally used to shock absorb the wheels for landing, was moved to hold the wing on! Thus (to stay close to scale) the kit was specially designed the same way. You might also note that we are including the EXACT SCALE pre-formed landing gear wire!

Seriously folks it is one heck of a good kit! THE REAL THING has top grade quality balsa and hardwood die-cutting with some machined parts. It has been designed to build extreamly fast (one or two evenings) and strong and is really a blast to fly! Your in for a real treat when you view the plans and instructions for building, as they are well done and really complete. For finishing we reccomend that you "do your OWN THING" in many ways. We are now building one that we'll finish like a WWI plane, with camouflaged color, sewing the top hatch on, a red, white and blue Nieuport rudder and of course a machine gun on top of the wing. Why not buy two just for fun?

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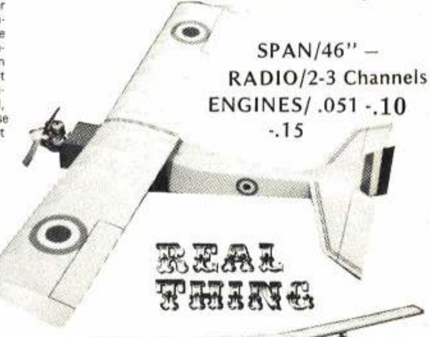

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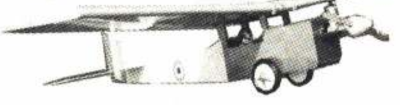

See August RCM for complete construction article

taipan
.21 (3.5cc)
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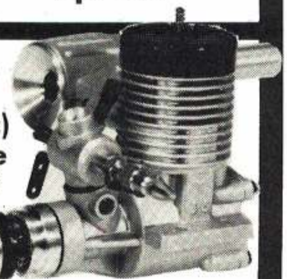
SCHNEURLE PORTED
R/C *BLACKHEAD

$38⁸⁸



NEW CLASS A HYDRO RECORD SET (55 mph)

On March 25, 1973 Ron Erickson set a new speed record for class-A hydro doing better than 55 mph! Ron was using the new Taipan .21 TBR R/C Schneurle ported Blackhead. Here is an excert from a letter of Ron to Hobby Shack;

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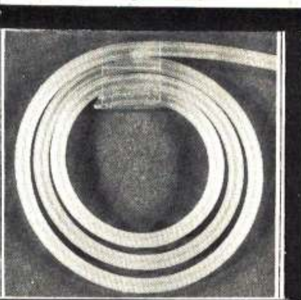

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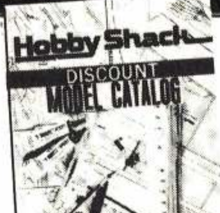

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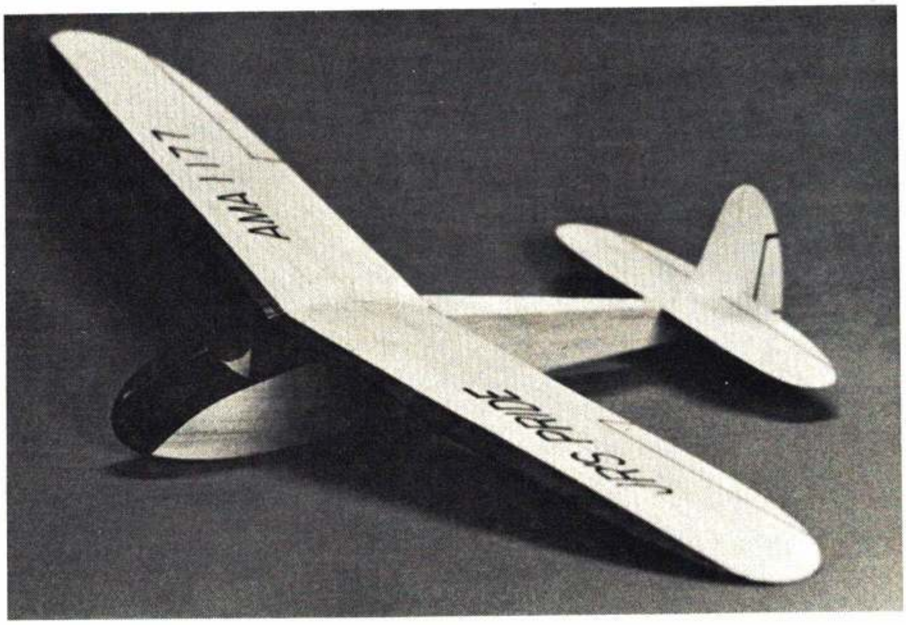
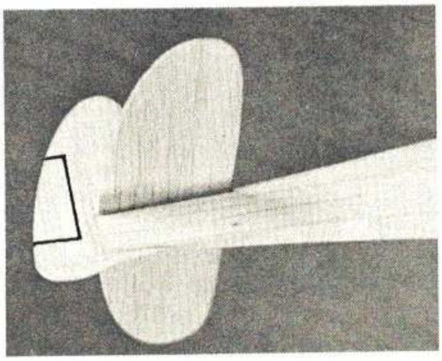
JR'S PRIDE

FOR THE TENDERFOOT

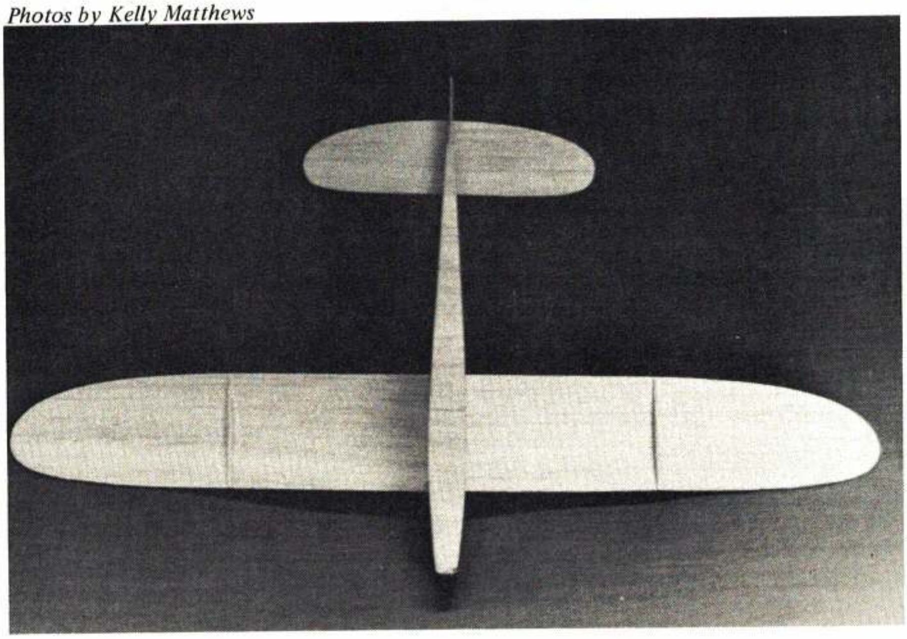
Very real-looking toss glider is all balsa and made from one sheet of wood. / by Herb Clukey





Above: It's a very lightweight all-sheet balsa model with really fine gliding ability. From a Tenderfoot's height hand launch, Jr's Pride should fly nearly 20 ft. Right: The tail pieces are sanded extra thin just to keep them light. Don't use much glue on this wood or else the wood will warp. Below: Good glide is because the wing is "undercambered." That means it is curved at the joint with the body and by two thin ribs seen here.

Photos by Kelly Matthews



Off on the right foot? You bet! Success in the first venture of a young man's modeling career, whatever it might be, is most important. In model aviation, Jr.'s Pride can provide such success.

The little ship is built ultra light and with its cambered airfoil, a majestic slow floating-type glide is produced. All flights are hand launched and if you are fortunate enough to be near a nice upwind slope, try a little slope soaring, as this gem has a glide ratio of 8:1 in calm air and will give you a lot of fun for the pennies invested.

Construction

In designing Jr.'s Pride, parts were kept to a minimum to facilitate construction. Cut out two fuselage sides, one each of No. 1 and No. 2 formers, one rudder, one stabilizer, two wing panels and four ribs. All parts are cut from one sheet of 1/32 x 3 x 36" medium balsa. Nose block is one piece of 3/8" square balsa. Be sure to follow wood grain as indicated on drawing.

Glue fuselage sides directly to nose block and also glue No. 1 in place. When dry, glue rear fuselage sides together, then add No. 2. Check your work for alignment as you progress. Add top and bottom covering as illustrated in drawing. Cement stabilizer in place, then the rudder. The addition of a windshield is optional. Glue ribs as indicated in each wing panel. When dry, join panels together and prop up each tip 3/4". Cement wing to fuselage when dry.

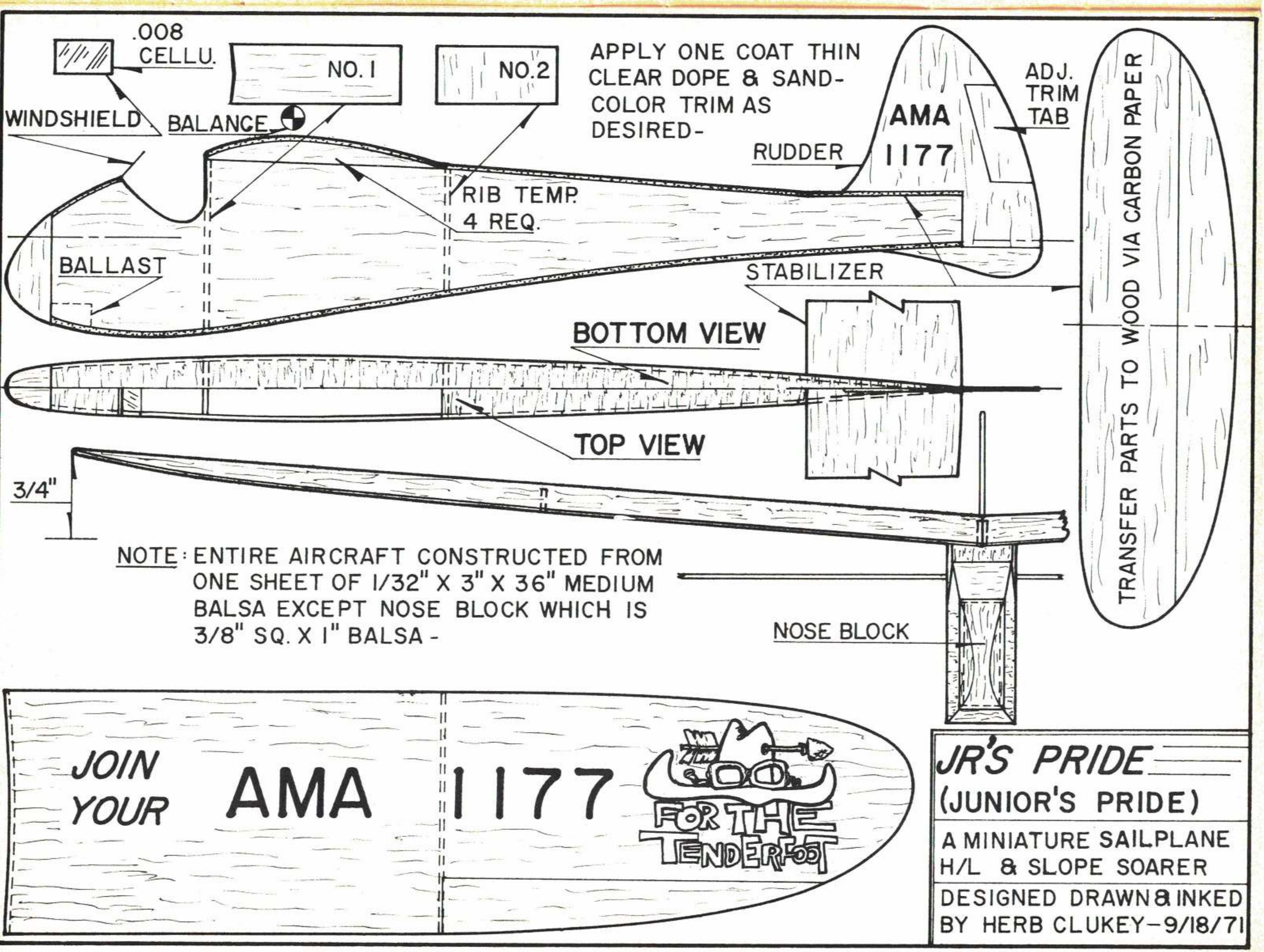
Look at your Jr.'s Pride—it is finished and beautiful from any angle. Now let's preserve it with a coat of clear dope. When dry, sand with fine sandpaper. This will cut down on surface drag and make the model more durable. Trim with color dope, but keep it to a minimum.

Flying

Now the real fun begins. Balance the baby by adding weight to the nose until a long floating glide is obtained. Trial and error is the best method. Remember that only a gentle toss is required. When ready, round up your pals and have an airplane "ball game." With a little practice you can stand about 30 feet apart and pass it to each other. The first one to drop it (it won't break) is "out." After this they might want to build their own Jr.'s Pride and have their own "ball," just as I am certainly having with mine—and I am a 45-year-old Junior!

Bill of Materials

1 1/32 x 3 x 36" medium balsa (entire airplane except nose block)
1 3/8 x 1" medium balsa (nose block)
1 one oz. bottle clear dope
1 small brush for dope
1 sheet fine sandpaper
1 sharp knife



APPLY ONE COAT THIN CLEAR DOPE & SAND-COLOR TRIM AS DESIRED-

NOTE: ENTIRE AIRCRAFT CONSTRUCTED FROM ONE SHEET OF 1/32" X 3" X 36" MEDIUM BALSA EXCEPT NOSE BLOCK WHICH IS 3/8" SQ. X 1" BALSA -

JR'S PRIDE
(JUNIOR'S PRIDE)

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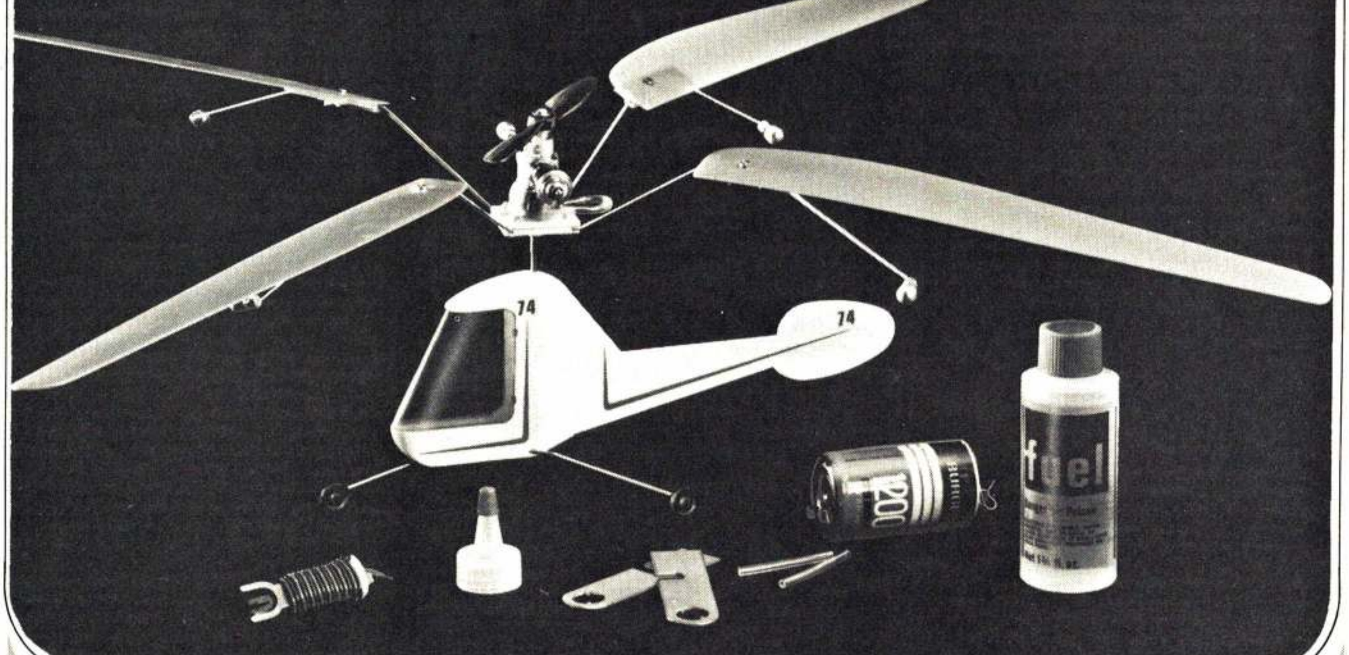

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TNT

CARL MARONEY ON RC

Solving Wing Linkage Connection: At the 1972 RC Soaring Nats this novel approach was being used by Tom Kelly from Lansing, Michigan, to allow a quick and clean method of connecting wing linkage without having to be a gymnast using both hands and feet.

Utilizing the parallelogram principle evolved into a unique design for a simple mechanism to actuate ailerons, flaps or spoilers. This system allows the conventional plug-in wing configuration and permits butt joint connections for motion transmission to wing controlled surfaces. Since nothing is connected solidly if a crash is encountered, the wings are free to pull off without tearing bellcranks, ribs or moveable control surfaces from the wings, thus creating an object of modern art.

By visualizing the inner tubes of the Nyrod linkage pushing, not pulling, in the direction illustrated by the arrows in the Kelly-Gram figure, you'll see how it works. The hookup, as shown, can be used for flaps or spoilers and reversing one U-control bellcrank represented by the dotted lines will permit aileron usage. Dihedral and/or sweepback designs have no effect as long as the small tubes are kept the *same* length front and rear. The 2-56 stud is used for system adjustment and is a bolt with the head filed down enough to slip easily in the outer tube. The system adjustment stud and clevis need only be performed once when the glider is first completed.

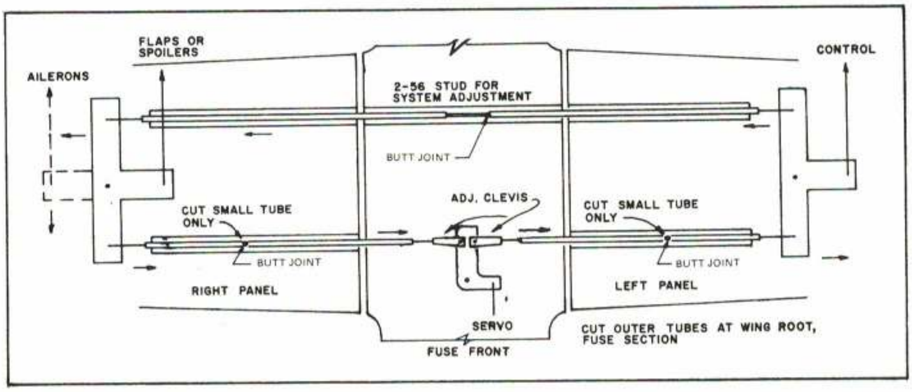
RPV Development: The Remote Pilot Vehicle (RPV) industry is experimenting with gliders for practicality in military missions. ASTRO Flight, Inc. has recently delivered an electric-powered flying wing developed under contract with Northrop Corp. In addition, AFI has moved to new facilities to keep up with the growing demand for ASW-17 production which has increased 30% in 1973.

New Soaring NATS Dates: The Soaring NATS have been rescheduled and will be held on July 23, 24 and 25 (Monday, Tuesday, and Wednesday) at Lewis College, Lockport, Ill. The new site is about 35 min. from last year's site at Miller Meadow. Preregistration is required and must be postmarked no later than June 30, 1973. For additional information and an entry form contact Dan Pruss, P.O. Box 49D, Plainsfield, Ill. 60544 (815 436 - 2649).

International Postal Contest: The San Fernando Valley Silent Flyers R/C Soaring Club is having its First Annual International Postal Contest. This will be a competition entered by individuals and clubs all over the world to exchange results and information relating to radio-controlled model sailplanes. Entrants will fly their models in the various Slope and/or Thermal events at sites of their choice, then will submit their performance results along with scale drawings and technical data by mail. The results and data on the most interesting submissions will be mailed back by the sponsoring club.

There will be both Slope and Thermal events, so that no matter where a flier may be located, he can compete with others any place in the world. For those fortunate enough to have both Slope and Thermal sites, there will be a combined division. Since all events, including Speed and Duration, Slope and Thermal, must be entered with the same model at the same flying weight, good information should be available for distribution on the best all-around models and fliers. Entrants may fly in any one or more of the six divisions. They are Slope, Thermal, and Combined Slope and Thermal for models having less than a two-meter wingspan and not more than two servos, and the same for models of any size and number of servos, limited only by FAI restrictions on size and weight. Competitors will fly their models between the 8th and 23rd of September (three weekends), and must have two witnesses sign their results. Entries must be postmarked no later than midnight, October 31, 1973. Those interested in entering should write for the rules and an entry blank to: San Fernando Valley Silent Flyers, Suite 410, 11665 West Olympic Blvd., Los Angeles, Calif. 90064. There will be no entry fee, but residents of the United States will be asked to include a self-addressed stamped envelope with their entries.

Bulent Mutlugil, an electrical engineering student at the Middle East Technical University at Ankara Turkey adjusts for max engine speed on his original RC glider. Model uses an A-2 wing with 6409 airfoil, foam-filled fuselage, power pod and SIMPROP proportional RC gear.



BOB MEUSER ON FF SPORT

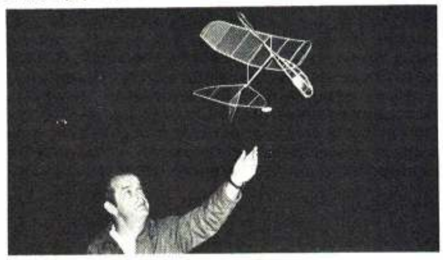
Everyman's Indoor Model: After extolling the virtues of the Pennyplane event for several years, I finally built one, and got my wife, Joanne, to build one too. It was her first model and the second indoor model I had built in recent history. I designed a plane based on Larry Cailliau's model that appeared in the February 1973 **AAM**, page 68, as his was a simple design and an excellent performer. The stabilizer was enlarged in an attempt to make the adjustments less critical, and solid motor stick was used in place of a tubular one.

Things went badly at first until Joanne learned how to hold a stick down against the building board without cutting it in half with her fingernail. Covering with Microlite was a traumatic experience I would rather not recall. We found later that you are supposed to put it on frames and handle it like microfilm. And you are supposed to trim it with a hot wire, not scissors.

In spite of the large size spars and solid motorstick—all made out of plain Sig contest balsa—and the great gobs of glue (Jo just wouldn't believe that a little drop 'll do ya), both models came out well under the minimum weight, so ballast was added to the nose. We hauled them off to the Cow Palace for a contest sponsored by the Oakland Cloud Dusters, the first Pennyplane meet in Northern California.

Joanne Meuser demonstrated that age 50 is not too late to start modeling, Pennyplane style. Took second place at Cloud Dusters meet with 8 min. 40 sec.

Erv Rodemsky, originator of the Pennyplane event, tried a 10-inch chord. Center rib on stabilizer serves as tailboom. Flew well, but built-up prop is not the ticket.



We flew Joanne's model first. A few test hops at low power were made to establish the proper wing incidence angle, then we tried one at nearly full winds. The little 12-in. prop buzzed its heart out and pulled the model to within inches of the drapes that festooned from the girders 90-odd feet overhead. It landed at 6½ min. with a quarter of the turns left. We had Rodemsky shorten the motor so we could learn his way of tying lubed rubber, and put up an official flight. The time was 8:40, best posted at that time, but later exceeded by Dave Parsons who made 10:30. We tried different motor sizes but could never beat that first official flight. The 14-in. prop on my model was too large for the rubber I had, and I was reluctant to cut it down, so I wasn't able to get better than about four min.

Now I know that everything I've been saying about Pennyplane is absolutely true. Anyone can build and fly one, special indoor wood is not required, and you certainly get more flying time per hour spent in construction than with any other class of model I have flown. There are many variables to play against each other—prop pitch and diameter, motor length and cross section—just as there are with any Indoor class. The minimum-weight, maximum-size rules promote a rugged model that can survive bumble-thumbed handling, yet the performance is quite satisfying. Pennyplane is an ideal first step on the Indoor modeling ladder, but I think I'll stay on Rung One for awhile. Pennyplane is enough of a challenge in itself.

The Spotter's Manual, Cont'd.: The 'Doctor 800 and the 'Duster 900, a pair of B-C-size gassies, have much in common—identical rudders, high thrust line, similar construction, and extremely good track records spanning a decade. But to the practiced eye, there is as much difference between them as between, say, a Satellite and a Sailplane.

The 'Doctor has four-break dihedral with a flat center, while the 'Duster has more common three-break dihedral. The 'Doctor has higher aspect ratios, especially in the stabilizer, and an undercambered wing profile. Engine pod construction is completely different—the 'Duster favoring ease of construction over aesthetics. Probably the most distinctive characteristic of the 'Doctor is its short, tapered outer wing panels.

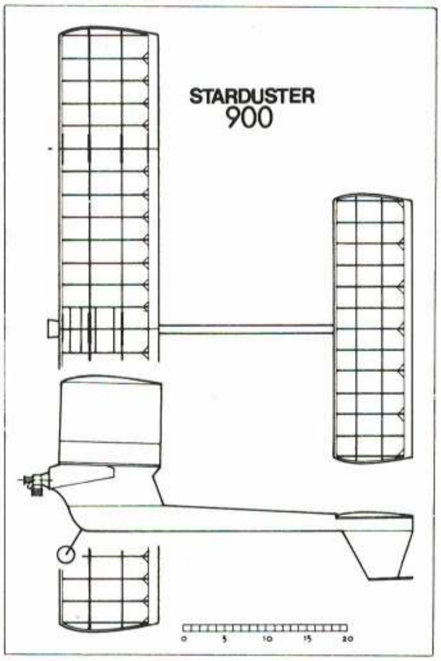
Sal Taibi introduced the 'Duster 900 in 1958 along with the popular Half-A version. Jim Clem's What's-It, later to become the Witchdoctor, first flew in 1963, and was put into production by Sig in 1968. Jim and his friends tried both flat-bottom and undercambered wing sections before settling on the somewhat more difficult undercambered wing.

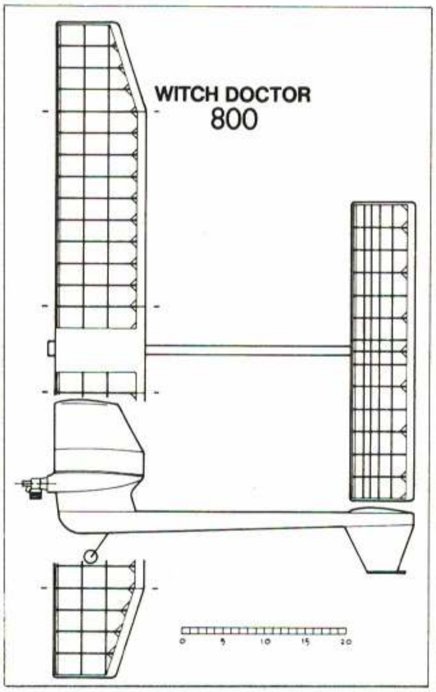
Their competition successes have been many: One that sticks in my mind is when a

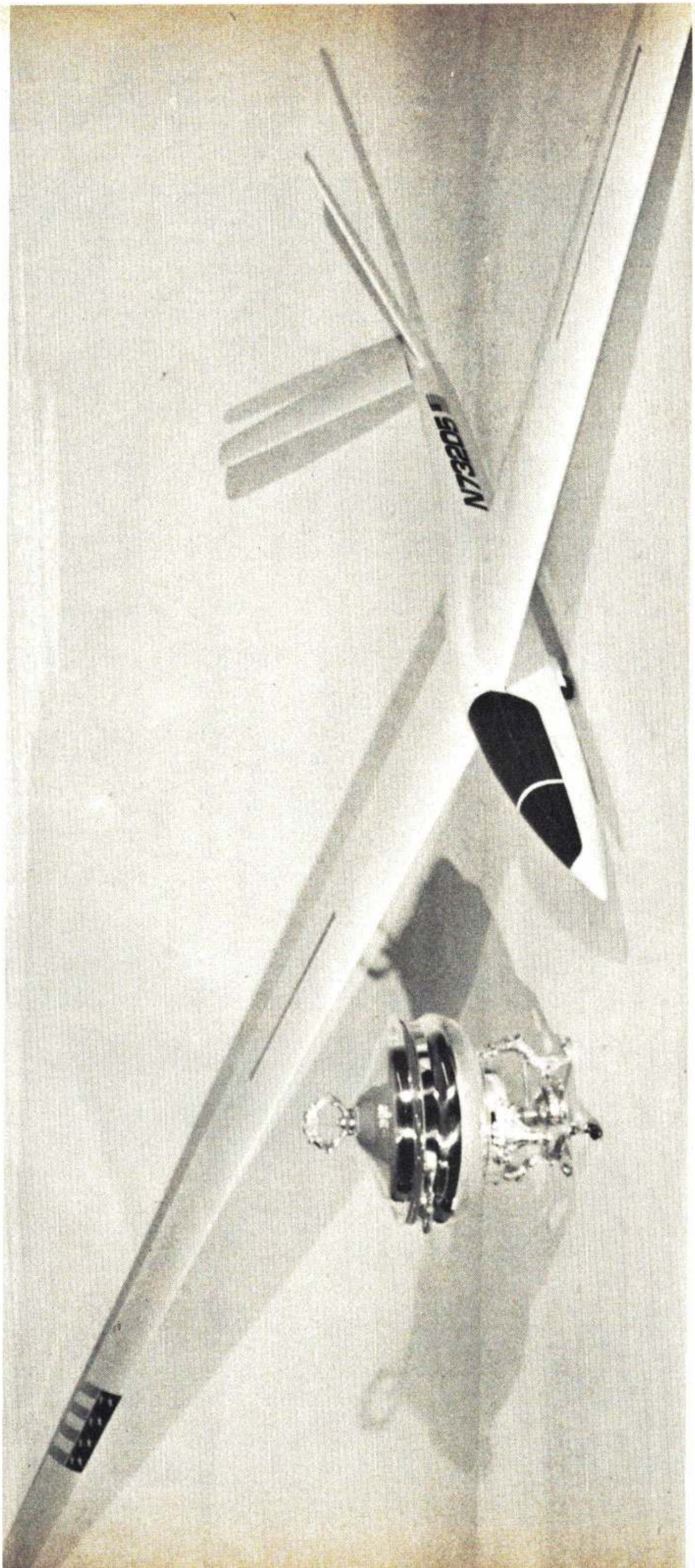
'Duster and a 'Doctor tied for first place in C, Senior Division, at the 1970 NATS. Most recent successes for the big Duster include first and third in Class C at the San Valleers Annual last fall, in the hands of Walt Ghio and ole Sal himself.

Walt's win was erroneously reported as having been made with a Witchdoctor—perhaps our little Spotters' Manual isn't just for neophites after all.

The kids had a ball with their first indoor models. L to R: Bob Nesbitt, Tim Young, Greg Xenakis, Penny Young, Bill Xenakis.

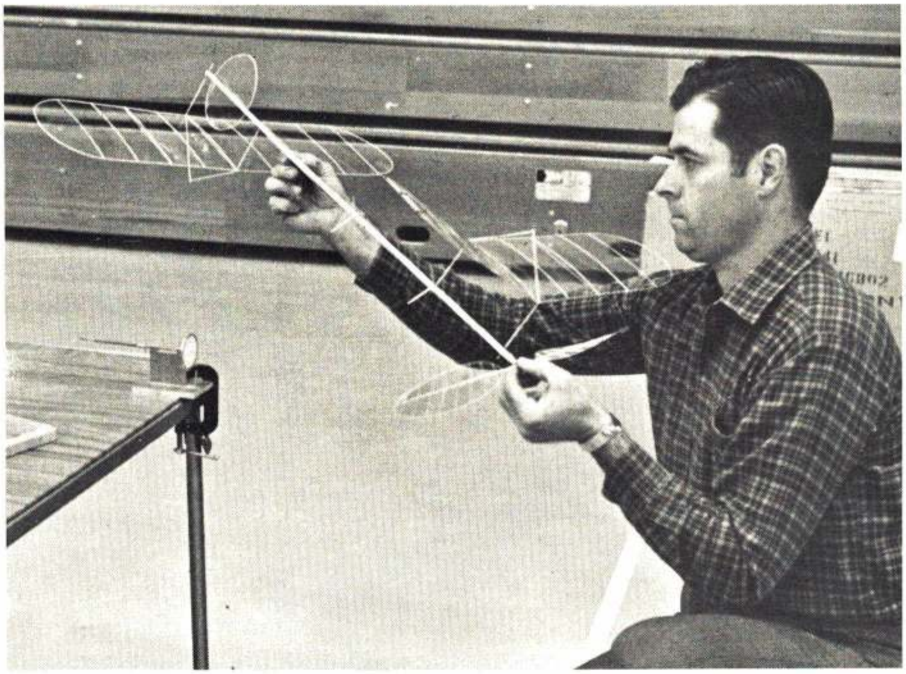




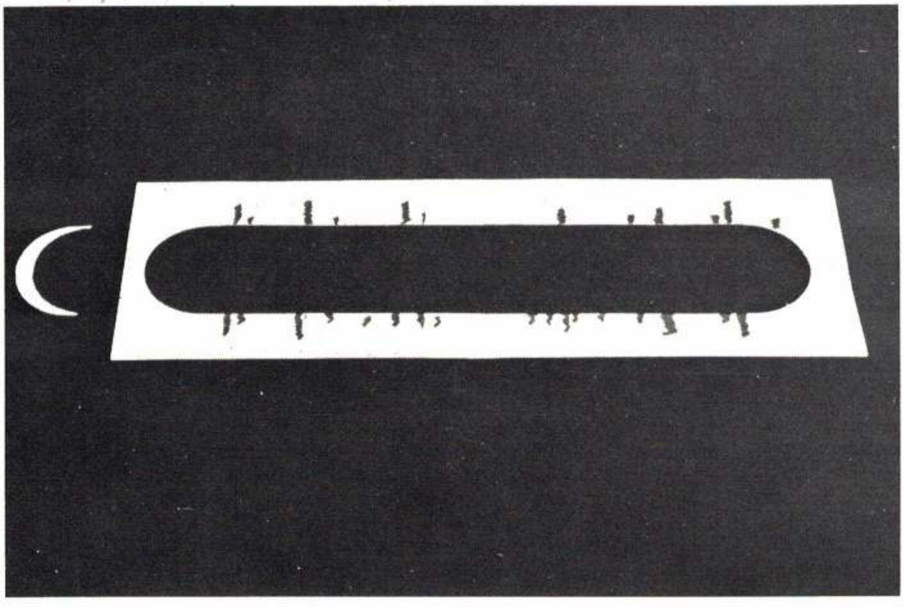


QUASOAR II, Neil Liptak's entry in the RC Sailplane category at Toledo, won second place.

FAI TANDEM



Above: Author "hooking up" fully wound rubber motor. Note stand used to hold model during delicate operations. Also, torque meter used for winding is clamped to the table here. Right: Forming wing tips on paper container. Below: Wing building form with removeable crescent.



Until the FAI adopted a one gram minimum weight rule for the 1972 Indoor World Championships, the design of indoor microfilm stick models had reached a plateau. A competitive model was invariably a conventional tractor with pylon mounted wing, a tail boom of about the same length as the motor stick, and a horizontal tail with area between 30% and 40% of the wing area. This basic configuration had evolved over many years in which indoor model weight was not restricted by the rules. In the absence of weight restrictions, the conventional configuration represents an optimum compromise between aerodynamic efficiency and structural weight. Successful designs could and did differ from each other in detail, but for a design to be competitive, its basic configuration had to fall within certain limits. Most experienced indoor modelers realize this fact intuitively and Max Hacklinger theoretically demonstrated it in the early Sixties.

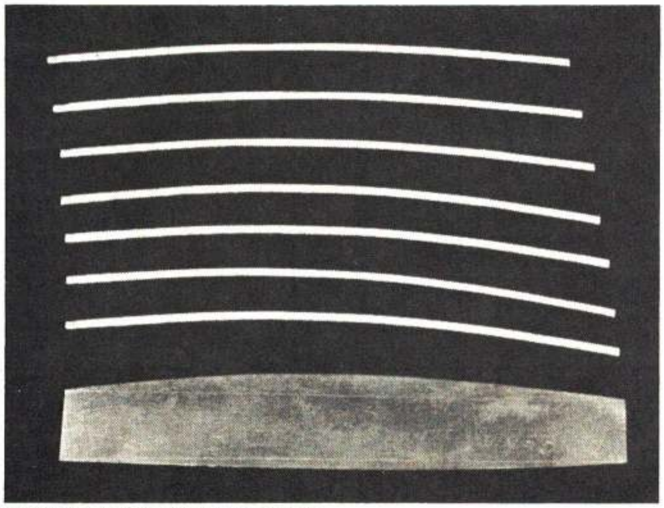
The new one gram weight rule, however, poses a different set of requirements than those which produced the conventional layout. It could well be that the optimum model for this new set of rules is quite different from the models which evolved in the absence of weight rules. The search for a new optimum configuration has already produced some unconventional models, such as the extremely low aspect ratio design flown by Jim Richmond in the 1971 team selection finals, and the biplanes by Clarence Mather and Tom Vallee. Designs along these same lines have also appeared in the Pennyplane class, as a result of the fact that the Pennyplane rules impose some of the same design constraints as the new FAI rules.

These unconventional approaches illustrate the design dilemma posed by rules which impose a maximum wingspan and a minimum weight. In theory, indoor model duration can always be increased by reducing the wing loading. In the past this was often done by reducing the weight of the model. With a minimum weight rule, the only way you can reduce the wing loading is to increase the wing area. But, because the span is limited, increasing the wing area means reducing the aspect ratio, thus increasing the drag. So, the rules force a trade-off between increased wing area and reduced flight efficiency.

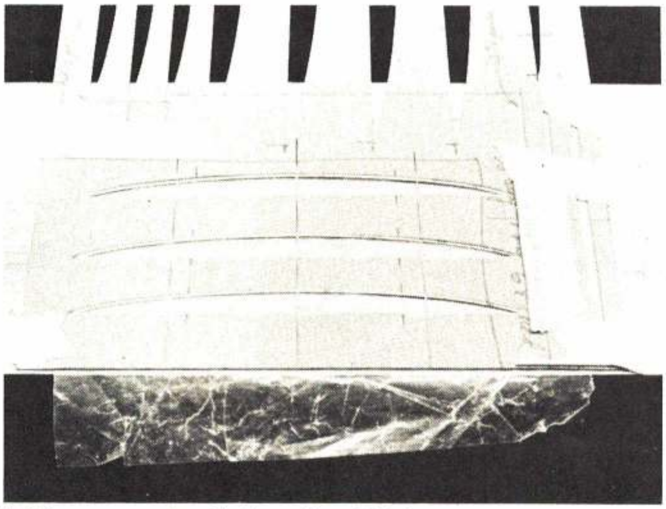
In order to see how various design factors can affect this trade-off, we spent some time developing a theoretical method for predicting indoor model performance. The method involves making theoretical estimates of a model's lift coefficient, overall drag coefficient, and propeller efficiency. After a lot of work, the method has been developed to the point where it is reason-

(Plans on page 32)
(Text continued on page 78)

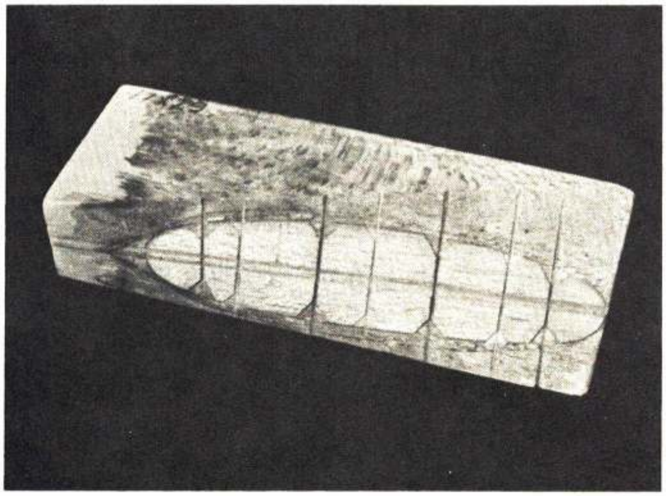
'...calculations indicated reduction of drag is achieved if lift is shared by two wings with enough verticle separation...it should have a slight edge over conventional designs....' Works for Pennyplanes, too. / by John P. Kukon



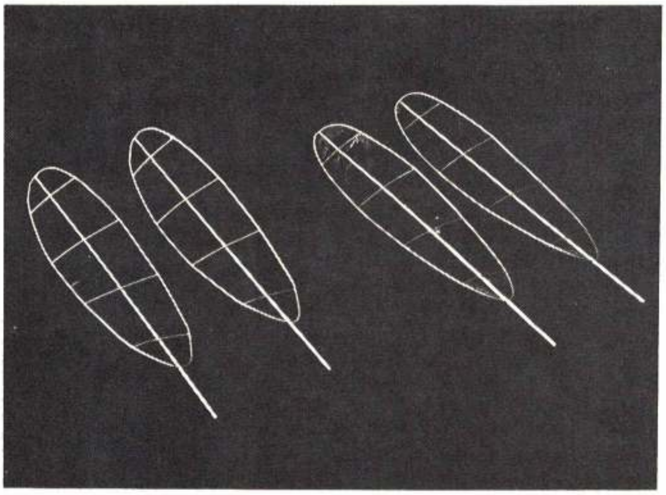
Wing ribs and their brass template.



Building compression ribs in cardboard rib form.

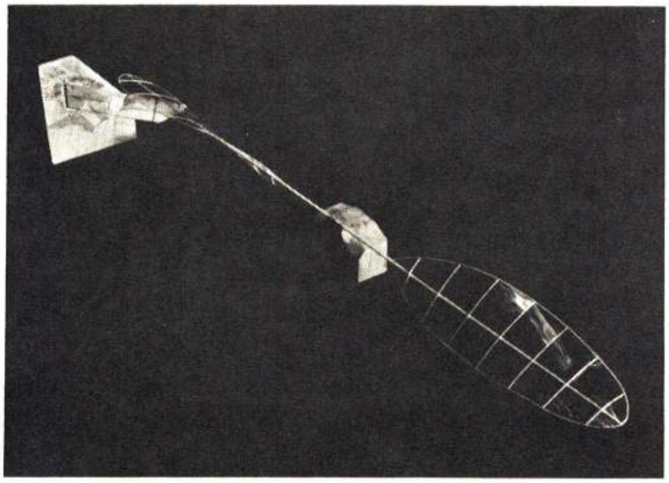


Props are constructed on a carefully shaped wood form.

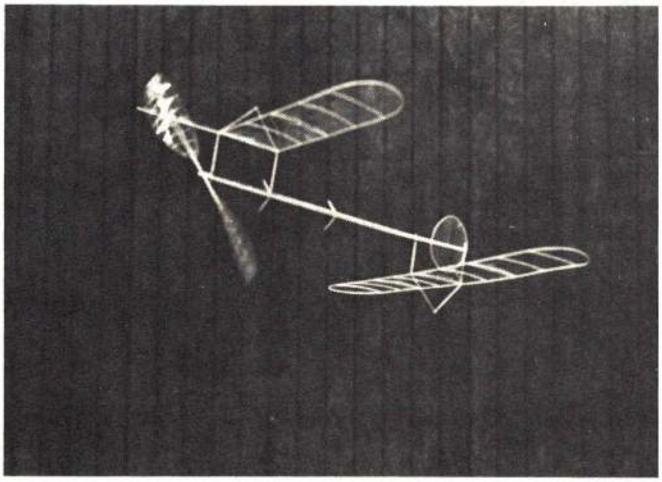


Two sets of propeller blade halves.

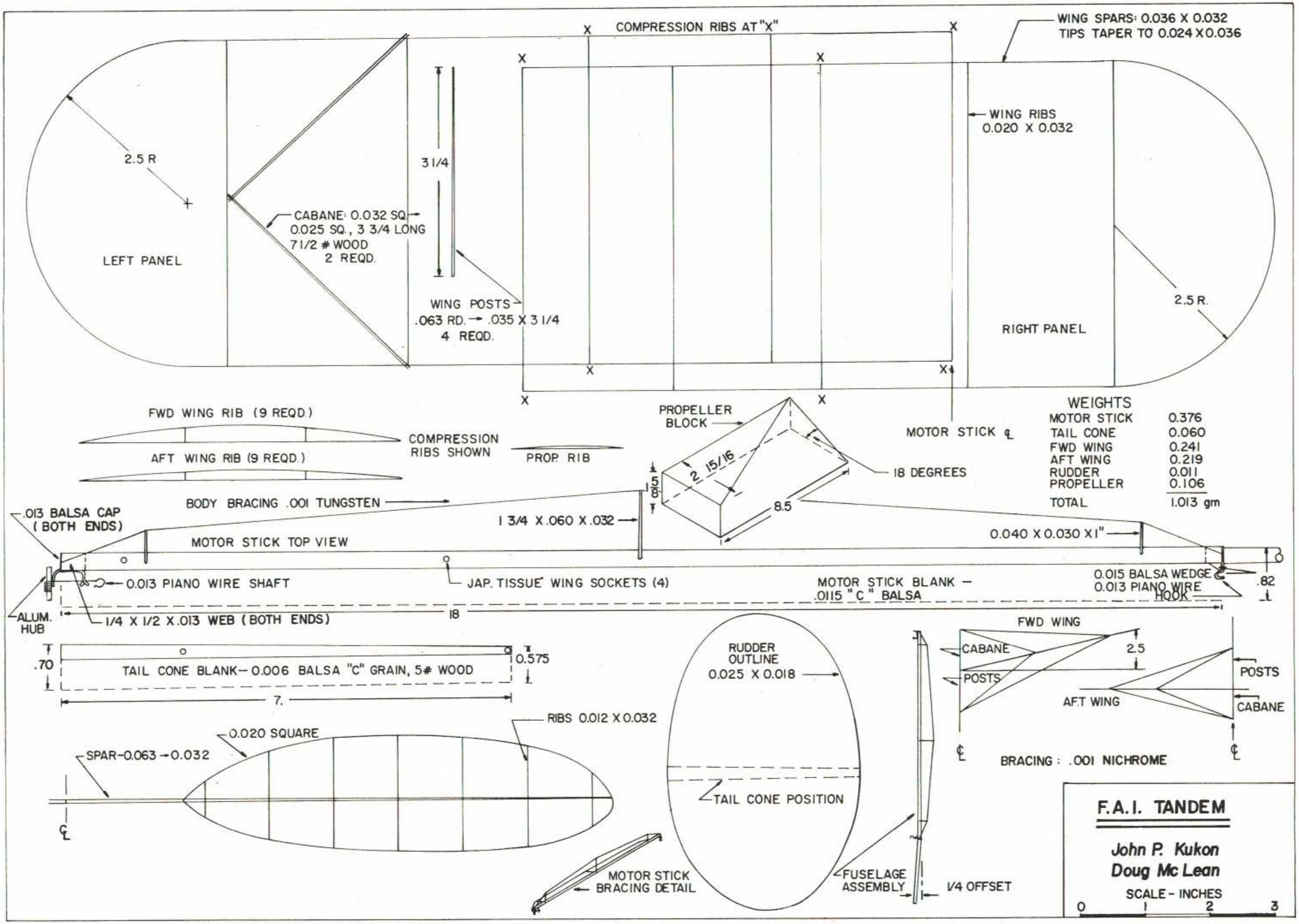
Complete prop set up in a pitch jig. Hub allows for changing pitch to suit motor.



She climbs out effortlessly. Front wing gives 65% of lift and rear wing lifts 35%.



FULL-SIZE PLANS AVAILABLE—SEE PAGE 84



WEIGHTS

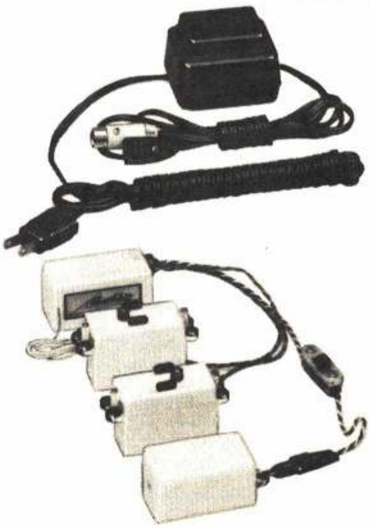
MOTOR STICK	0.376
TAIL CONE	0.060
FWD WING	0.241
AFT WING	0.219
RUDDER	0.011
PROPELLER	0.106
TOTAL	1.013 gm

F.A.I. TANDEM

John P. Kukon
Doug Mc Lean

New Heathkit 3-Channel System

from **139^{95}***



3-Channel System

3-Channel System
with 4th Channel option
installed

...goes to 4-channels when you're ready

There's no magic involved. Just traditional Heath planning and attention to detail. What appears to be a dandy kit-form 3-channel system, quickly and economically becomes 4 channels with the addition of an optional modification kit. Order 3 now, add the fourth later. It's a system designed to grow as your plans do.

The Heathkit GDA-1057 System uses the flight proven circuitry found in the popular Heathkit GD-19. The GDA-1057-1 3-Channel Transmitter comes with a 2-axis stick assembly. Add the GDA-1057-4 modification and you put 3 channels on the stick with the fourth controlled by a thumb tab. The GDA-1057-1 Transmitter is available on all R/C frequencies, and is housed in a slender new case for positive one-hand action during launch or engine adjustment. Other top-flight features include all nickel-cadmium battery packs with external charging unit, vinyl-covered front panel, adjustable hand strap, telescoping whip antenna, and relative power output meter that doubles as a battery-charging indicator. The new compact GDA-1057-2 3-Channel Receiver has a molded nylon case and connector block for servos and receiver battery pack. It's compatible with all Heathkit servos, and the GDA-1057-4 mod kit converts it to 4-channels too.

SPECIAL SYSTEM PRICE #1 — Order 3-Channel Transmitter, Receiver, Receiver Battery, two GDA-19-4 Standard Servos, pay just $139.95.

SPECIAL SYSTEM PRICE #2 — Order same system as above, substituting either GDA-405-44 Miniature Servos or GDA-505-44 Sub-miniature Servos, pay just $149.95.

SPECIFY FREQUENCY WHEN ORDERING.

Kit GDA-1057-1, 3-channel transmitter, 4 lbs.	**74.95***
Kit GDA-1057-4, 4-channel modification pack for both transmitter and receiver, 1 lb.	**19.95***
Kit GDA-1057-2, 3-channel receiver, 1 lb.	**34.95***
Kit GDA-405-3, receiver battery, 1 lb.	**9.95***
Kit GDA-19-4, standard servo, 1 lb	**19.95***
Kit GDA-405-44, miniature servo, 1 lb.	**24.95***
Kit GDA-505-44, sub-miniature servo, 1 lb.	**24.95***

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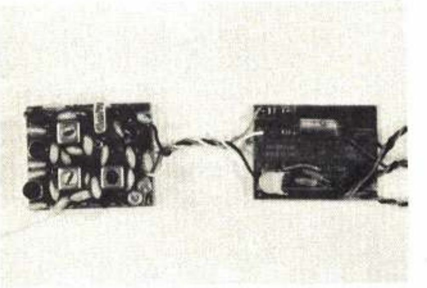
*Mail order prices; F.O.B. factory. RC-102

ACE R/C digital commander KIT

- Two channel system using IC's and latest state of the art; may be expanded to 4-6-8 channels.
- Receiver-Decoder (2) will work with most modern 4-6-8 channel digital transmitters on same frequency! Reads aileron and elevator signals--ignores the rest.
- Receiver-Decoder (2) works modern digital servos.
- Receiver-Decoder (2) offer inexpensive way to go with your present system for glider, plane, boat or car: use with extra servos you already have. Or use our combo flite pak: receiver-decoder, two servos, etc.
  - Available on the following frequencies: 27.995, 27.045, 27.095, 27.145, 27.195 53.100, 53.200, 53.300, 53.400, 53.500



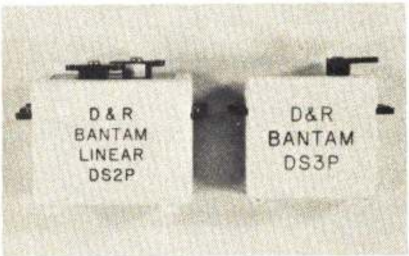
digital commander RECEIVER DECODER (2) KIT

IC's simplify wiring and set up of 2 channel decoder. Receiver is exceptional double tuned front end which uses discrete components for the highest selectivity and greatest range. Complete with detailed step by step instructions. Weight of completed receiver-decoder is 36 grams or 1.26 ounces.

No. 12G20—Digital Commander Receiver-Decoder Kit (2) (Less case, connectors, switch)	$27.95

Please specify frequency

No. 19L50—Deans 4 pin connector set	.95
No. 40L252—CW DPDT Slide Switch	.59
No. 30L21—Switch Guard for above	.39
No. 21K30—Formed ABS case for Receiver-Decoder. (All models)	2.00



digital commander SERVO KIT

Housed in the D & R Bantam DS3P mechanics, uses WE 3141 IC for ease in assembly. Kit contains motor, pot, wiper and all components required, with step-by-step manual.

Weight for the DS3P servo is 37 grams: 1.3 ounces. With the DS2P servo, 44 grams: 1.55 oz.

No. 14G20—Digital Commander Servo Kit	$21.95
No. 14G20L—As above, except with D & R DS2P Linear Mechanics (Less connectors)	22.95

digital commander FLITE PAK KIT COMBO (2)

If you intend to use Commander Digital (2) with your multi digital transmitter, all you need are the receiver-decoder and 2 servo kits. Combo offers savings over kits purchased individually. Includes 3 connectors, switch, hookup wire for cabling. Everything you need to make complete 2 channel-2 servo pack for your sailplane, boat or car, except batteries.

Weight of the complete 2 channel Flite Pak, including ABS case and connectors and switch, but less batteries, is 113 grams or 3.9 ounces.

With 225 ma SCL batteries, 160 grams or 5.64 ounces.

As above, but with 450 ma SCL batteries, 190 grams or 6.7 ounces.

No. 12G30—(2) Flite Pak Combo	$64.95
No. 12G30L—As above, but with D & R DS2P Linear Mechanics	66.95

Please specify frequency

NEW! NEW! NEW!

digital commander (1-8)

RECEIVER-DECODER KIT

Up to 8 Channel Capability!

Here is the Ace Digital Commander (1-8) Channel Receiver-Decoder Combo. This is the ultimate of the 2 channel system developed by Fred Marks, which received a great reception and met with fantastic success in the field.

Voltage regulator has been added to replace original filtering of power supply--this results in outstanding improvement of performance.

With the new decoder you have your option of going with 2, 3, 4, 5, 6, 7 or 8 servos--whatever your transmitter provides.

The Ace Digital Commander Receiver-Decoder Combo will work with any of the present day transmitters available, provided they are on the same RF frequency. It will not work with the Jerobee, ACL Digilog, or Digitrio.

The unit is just as simple and easy and straight forward to wire as the 2 channel. The secret is using IC chips.

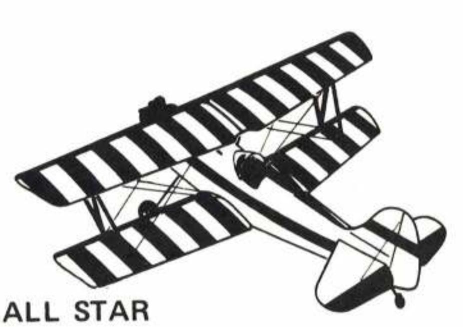
May be used with the Ace Digital Commander servos or any positive pulse servo. Provisions for three or four wire output from the decoder.

Unit in its vacuum formed case measures 1.45 x 1.72 x 1" deep. Weight of the receiver decoder is 1.4 ounces.

Kit includes ABS formed case. No connectors are furnished. Step by step instructions.

No. 12G18—Digital Commander (1-8) Channel Receiver-Decoder Kit	$34.95

- Available on the following frequencies: 26.995, 27.045, 27.095, 27.145, 27.195 53.100, 53.200, 53.300, 53.400, 53.500



ALL STAR

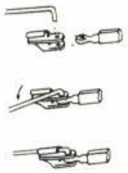
BIPLANE KIT BY ROMAN BUKOLT

Uses two sets of Ace Foam Wings for ease of building. For use with .09 to .15 power and 2 or 3 channel digital. Do NOT overpower! Beautiful Experimental Aircraft Association type plane.

131200—All Star Deluxe Biplane Kit	$21.95

Packaged R/C Accessories
ACE R/C INC.
HIGGINSVILLE MO 64037

SWING-IN KEEPER



- Simple to connect
- Bend wire first—then
  1. Insert
  2. Swing
  3. Snap
- No stress on installation
- Clevis type guide keeps wire from going too far into the hole

36L196—SK-Swing-In Keepers, pkg. of 4	.60

FIBERGLASS REINFORCING TAPE

These tapes, in three widths, are specifically for reinforcing wing center sections, nose sections, landing gear areas, and any other areas where extra strength is needed. Have interwoven edges to prevent unsightly unravelling.

36L193—FT15-Fiberglass Reinforcing Tape 1½" wide x 60"	.75
36L194—FT3-Fiberglass Reinforcing Tape 3" wide x 60"	.90
36L195—FT6-Fiberglass Reinforcing Tape 6" wide x 60"	1.50

VINYL TAPES

Just peel and apply.

All of the Ace tapes are made of closed cell vinyl by 3M. This means this is the best grade available. Will not discolor or absorb fuel. The strength of the adhesive improves with age.

Seating Tape

This is used for wing seatings and hatches. Great for waterproof seating and boats. Tape conforms easily to any contour.

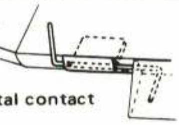
36L191—ST838-Vinyl Seating Tape 1/8 x 3/8 x 36"	.70
36L192—ST1614-Vinyl Seating Tape 1/16 x 1/4 x 36"	.60
36L142—ST814-Vinyl Seating Tape 1/8 x 1/4 x 36"	.65

Double Coated Mounting Tape

Excellent for instant and positive mounting of servos in any variety of items. Absorbs vibration so installation is shock resistant.

36L264—DT116-1/16" Double Coated Mounting Tape, 1/2" wide x 36"	.75
36L276—DT18-1/8" Double Coated Mounting Tape, 1/2" wide x 36"	.79

AILERON—ELEVATOR HORN BEARING



- Simple, neat, sturdy
- Reduces friction
- Avoids metal to metal contact

36L190—AEH-Aileron and Elevator Horn Bearing, pkg. of 4	.75

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ACE R/C INC.
HIGGINSVILLE, MO. 64037

ACE R/C INC. Have Fun--
Fly the Simple System:

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--WITH Nicads and Charger
--From 2.5 Ounces

RUDDER-ONLY PULSE IS:

*** LIGHTEST WEIGHT--2.5 oz. for Baby.**

*** LOWEST COST--WITH airborne nicad batteries and charger--begin at $69.95!**

*** SIMPLEST--only one moving part, easily serviced and maintained; noise free.**

*** VERSATILE--Arrange to suit your particular installation. You can go up or down in size without obsoleting receiver or transmitter--simply change battery pack and actuator.**

*** FULLY PROPORTIONAL**

PULSE COMMANDER R-O SYSTEMS

Completely wired, tested and guaranteed. With airborne nickel cadmium battery pack and charger; less transmitter battery.

10G15—Baby System	$69.95
10G15T—Baby Twin System	$72.95
10G16—Standard System	$71.95
10G17—Stomper System	$74.95

26.995, 27.045, 27.095, 27.145, 27.195
Please Specify Frequency

ACTUATOR/BATTERY COMBOS

Here is what makes the Pulse Commander versatile. All you need to put in plane for extra installations. With connectors, so you just plug in receiver.

15K15—Baby/225 ma Batt.	$11.95
15K15T—Baby Twin/225 ma Batt.	$14.95
15K16—Standard/500 ma Batt.	$13.95
15K17—Stomper/500 ma Batt.	$16.95

DICK'S DREAM KIT
Highly Recommended for Beginners

† 34" Foam Wing sections. † Top grade die-cut wood parts. † For .020 engines. † Commander Baby or Baby Twin. *Owen Kampen design.

13L100—Dick's Dream Kit $6.95

ACE HIGH GLIDER KIT

† 70" Foam Wing sections. † Precision machine cut and sanded wood. † For .049--Power Pod parts supplied. † Recommended for Rudder-Only--Standard or Stomper. *Owen Kampen design.

13L104—Ace High Glider Kit $14.95

SKAMPY KIT

A Goodyear scale type racer for the experienced rudder only flyer. † 30" foam wing. † Top grade machine cut sanded wood. † For TD .020. † Baby Twin Pulse Commander recommended. * Owen Kampen designed.

No. 13L103—Skampy Kit $6.95

2T KIT

† 50" Foam Wing, 3 Moulded Sections. † Precision machine cut and sanded wood. † For .049. † 2 Channel Trainer, use with bricks or servos. † Works beautifully as Rudder-Only Pulse Proportional ship with Commander-Standard or Stomper.

13L106—2T Foam Wing Airplane Kit $14.75

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UPDATED CATALOG
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Handbook has expanded data on How Pulse Works, Installation, How to Fly -- and much more. Most complete information on Pulse Rudder-Only available anywhere.

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Add Another Command! --
Ace Digi-POD SERVO

EXTRA: May be used with ANY modern digital system available--2, 4 or more channels.

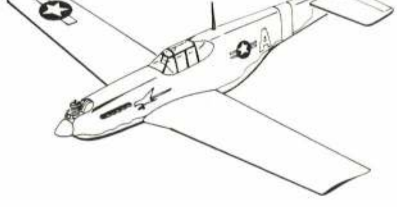
Been wishing you had another function with your digital? It's simple and easy with the Ace Digi-POD servo.

The Digi-POD is a pulse omission unit, which is triggered when the pulse train from your digital transmitter is interrupted approximately .25 seconds. A 3 position sequencing device, going from one position to the next. Response is smooth and quick. Easily hooked up.

Transmitter modification is simple and full instructions are supplied for the Commander Digital 2 along with a kit of needed parts. NOTE: Kit also contains theory and procedure to enable experienced to make mods for other transmitters. Factory conversion of your transmitter is also available at nominal cost.

The Ace Digi-POD is available only as a completely assembled unit. Housed in D & R Bantam case. Weighs 39 grams, less connector.

No. 15G3—Assembled Digi-POD Servo	$28.95
No. 11G2—Digi-POD Parts and Instructions for Transmitter Conversion	1.75
No. 11E3—Digi-POD Factory Conversion of your Transmitter.	6.00



Builds either P51B, Hurricane Mk IIc or ME109E

Design by Roman Bukolt

PRESENTED IN R/C MODELER

Choose the WW II Semi-Scale bird you'd like to build--the Ace kit will make it a pleasure.

Kit contains precision band sawed and machine sanded balsa and hardwood parts. Some portions of the wood is blank to let you make the variations required for model of your choice. This makes the flexibility to allow you to choose one of the three possible designs. Step by step details are shown on the plans.

Kit features the use of Ace Foam wing--two taper sections, and a constant section--to make for easy construction of any of the three wing configurations.

Each War Bird has a span of 42" and an area of 225 square inches. Designed for docile performance with a Cox Babe Bee or Golden Bee and Pulse Commander Rudder Only. Or use a Tee Dee .049 with a 2 channel digital for commanding characteristics. One secret to the War Bird is: Do NOT over power--for scale-like and realistic flying.

No. 13L110—Ace War Bird Kit $17.95

BILL BOSS ON CL

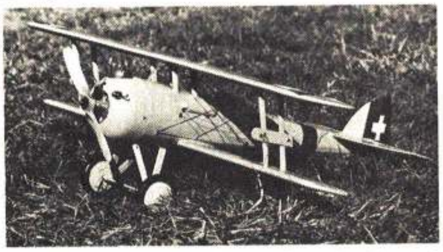
Choosing a Plane for Scale Competition: As indicated in last month's column, much is being said in club newsletters about "Getting Started in Scale." In the September 1972 issue of **AAM** we explored the possibilities of using Profile or Semi-Scale planes as starter type projects. Last month the suggestion was to get started by using scale kits which are in abundance on the modeling market. For the control liner this includes the kits marked RC, as it takes very little effort to install a bellcrank for the control-line system.

Among the recent newsletter articles on Scale, Editor Dave Kyte of the Lansing Flying Aces Newsletter ran a series of articles on the getting started in Scale theme. One article that should be of interest to the beginner covered his views on "Choosing the Right Plane." In choosing a plane for Scale competition the following points should be considered: Difficulty of construction; how well it flies; optional features; models size; technical data availability; power plants.

Construction—Ask yourself the following: Will the skin of the plane be difficult or easy to duplicate? This is very important, as basically it makes no difference what the inside construction is like—it is the outside that is judged. An all-metal plane with many compound curves is generally very difficult to duplicate. Some examples in the category are the P-51, Spitfire, P-38, etc. While on the other hand, planes with round or box-like fuselage construction should be considerably easier. Planes of the latter type are those of World War I vintage, i.e., Nieuport 28, Fokker D-7 Spad and possibly trainer-type planes of the 1930s.

Flyability—How well does the plane that you have chosen fly? Is it capable of doing maneuvers? It would appear that a plane capable of doing a good selection of the maneuvers as outlined in the Scale rules has an excellent chance for a better score during the flight portion of Scale competition than a fighter type that is not capable of great maneuverability or sustaining inverted flight very long. If maneuverability is your goal, choose a plane with a nearly symmetrical airfoil—perhaps some of the early biplanes or trainers. A well-made, uncomplicated model with good maneuverability stands a good chance in competition because builders of the more sophisticated variety generally do not employ more than one or two operational features.

Optional features—If you choose the route of fighters or bombers, there is a wide range and variety of operational features that can be employed. The idea here is to choose a plane and operational features that fit your building capability. One feature that might be costly, but is readily available on the modeling market, is gear retraction. Remember, this operational feature is worth 25 points.



Nieuport 28 with Swiss markings by Howard Efron, Clifton, N.J., powered by OS MAX engine, is a good example of a "Getting Started In Scale" project. With plenty of power up front, the plane took first place in Senior Scale at a recent Garden State Circle Burners (N.J.) meet.

P-51 by Homer Hudson, Philadelphia, Penna., is an extremely sophisticated model featuring retracts, operating flaps, lights, metal covering, sliding canopy, and many operating access hatches and panels.

Model size—What scale will the model have to be for putting in the details, and still maintain proper wing loading for good flying characteristics? A scale of 2" = 1' may be great for detail work, but if you choose this scale for a Super G Constellation, the plane would have a wingspan of over 20 ft. So, for a plane like the Connie a scale of 1/22 or 1" = 1' would keep it to a reasonable size. There is, however, one disadvantage, in that cockpit detail and the like becomes more difficult.

Technical data—Will technical data for proof of scale be easy to obtain? A good set of three-view drawings is a must for competition. Photos, proof of details installed, coloring and marking data, go a long way toward getting a better score in the static judging. Before starting your project, obtain some of the above items and study them well.

Power plants—Regardless of what type model you build, all the work will be for naught if the engine won't lift the plane off the ground or keep it flying after it is airborne. While there isn't any hard and fast rule about what size engine is to be installed in any given size model, you might consider the following: Don't be afraid to install an engine a little larger than the one that might be recommended (especially in kits), as long as the engine compartment size will allow it to be installed. Stick with tried and true standard engines, stay away from the exotic hopped-up variety. A good, steady, dependable, well broken in engine is the key to successful Scale flying. Remember, a small engine can't deliver that burst of power you might need that a larger throttle controlled engine can.

Next Month—A brief rundown on various types of aircraft, and how they do or do not lend themselves to Scale competition.

Reader Survey: A number of inquiries have come my way asking why I don't plug the "Stand-Off Scale Event" for Control Line. I would like to turn the question around and ask you for your thoughts on the subject. Does Stand-Off Scale increase interest in the regular Flying Scale event? What rules would you use? How many clubs have tried such an event? How many entrants did you have? Send comments to Bill Boss, c/o **AAM**.

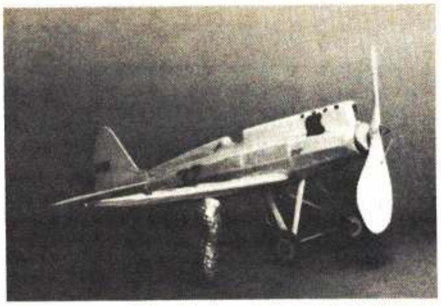
WALT MOONEY ON FF

Outlining Control Surfaces: Part of the finishing touch that is required on a quality Scale model is an indication of the control surfaces. Generally the old hands do this with either a fine pen and India ink or thin strips of black tissue doped in place. William P. Beck of Lakewood, Colo. suggests Chartpak tape as an easy way to add line detail. A roll of black tape 1/32 by 648" costs about 70 cents. This will outline an awful lot of Peanut Scale control systems and quite a few even if you build Jumbo Scale. "Chartpak" makes this tape in many others widths and colors and can come in handy for other modeling applications.

Indiana Peanut Scale: Phil Cox of Highland, Ind., wrote Bob Peck a letter reporting the results of the Griffith Barnstormers M.A.C. first Peanut Scale meet. Basically an RC and UC club, Phil had little confidence that there would be a good turnout and was pleasantly surprised when there were eleven entries, three from another local club and eight of their own members. Bob Postage took first with a 1910 Cessna, Bob Pierce and Phil Cox took second and third flying Pietenpol Air Campers built from Peck Polymer kits.

Bob Peck's daughter Jill does a fine job flying her Air Camper model in the local San Diego Orbiteer contests.

Peanut Hall of Fame: The winner of the first ever Peanut Scale contest was Henry Struck flying a Benny Howard "Pete" racer. The model has been recently donated to the Russ-Craft Model Museum in San Marcos, Calif. The photo of the "Pete" was sent this way by Bill Hannan.



The winner of the first organized Peanut Scale contest ever held, see text.

Jill Peck, age 10, launching her Peanut Scale "Pietenpol Air Camper."

Wrong Emphasis: One of the complaints that has been heard from time to time is that the existing Peanut Scale rules emphasize flying over scale to such an extent that the results have a tendency to discourage rather than encourage growth of the event. Generally, a very light but little scale model can win almost any contest to the discouragement of other entrants who prefer more scale in their models. This was evidently the case at the last Flightmasters Indoor Scale contest.

With the rules as they stand, where flight time points can exceed scale points by a large margin, it is important that a modeler who wants to win build to fly at the expense of scale and details.

At one recent meet a Junior who had entered a Curtiss Robin was heard to ask what the model was that won the contest. Imagine his chagrin to learn that it was also a Curtiss Robin. "*A long, narrow, big-tailed, long landing geared, single surface covered, Curtiss Robin.*" No one should blame the builder of a model that wins under the standing rules, but when the winning model is unrecognizable by a Junior who has entered a Scale model of the same airplane, it is time a rule change be considered.

One effort to do this was used at the Flightmaster's last Jumbo Scale contest, where no model could amass more flight points than it obtained in the scale judging. While partly successful, this approach has the unfortunate effect of penalizing the novice or beginner who has not yet developed the skill to make beautiful scale models as well as the guy who used to sacrifice scale points to obtain greater flight potential.

How about making scale and flying equally important in Peanut Scale contests? How? Easy! Judge the flying part and the scale part of the contest in any manner desired. Then assign positions for scale and flying to the models in order of their capability. The best flying model would get one point, the second best would get two, etc. The best Scale model would also get one point and the second best two, etc. Add the points each model is assigned and the model with the least points is the overall winner. Obviously this system allows ties on occasion. If one occurs it can be eliminated by agreeing that the model with the best flight position (or best scale position) is in the lead position of the two. Or the two sportsmen could flip a coin. The above system makes scale and flying equally important. What do you readers think of this approach?

Every Scale judge that I ever met conscientiously tries to do the judging in an objective manner. However, in my experience the numerical judging systems make it almost impossible to do a good job. Why not just do the scale judging by lining the models up in a row with the best one first and so on down the line until the poorest is at the end. Close, careful judging need only be done between two adjacent models on a comparitive basis on which it is much easier to be objective. The time required to scale judge a large entry field could be reduced to only a few minutes.

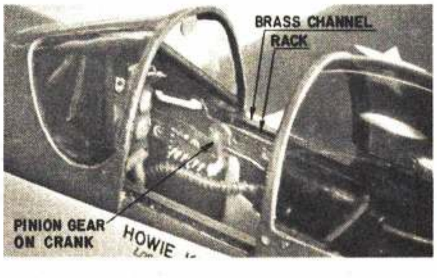
CLAUDE McCULLOUGH ON RC

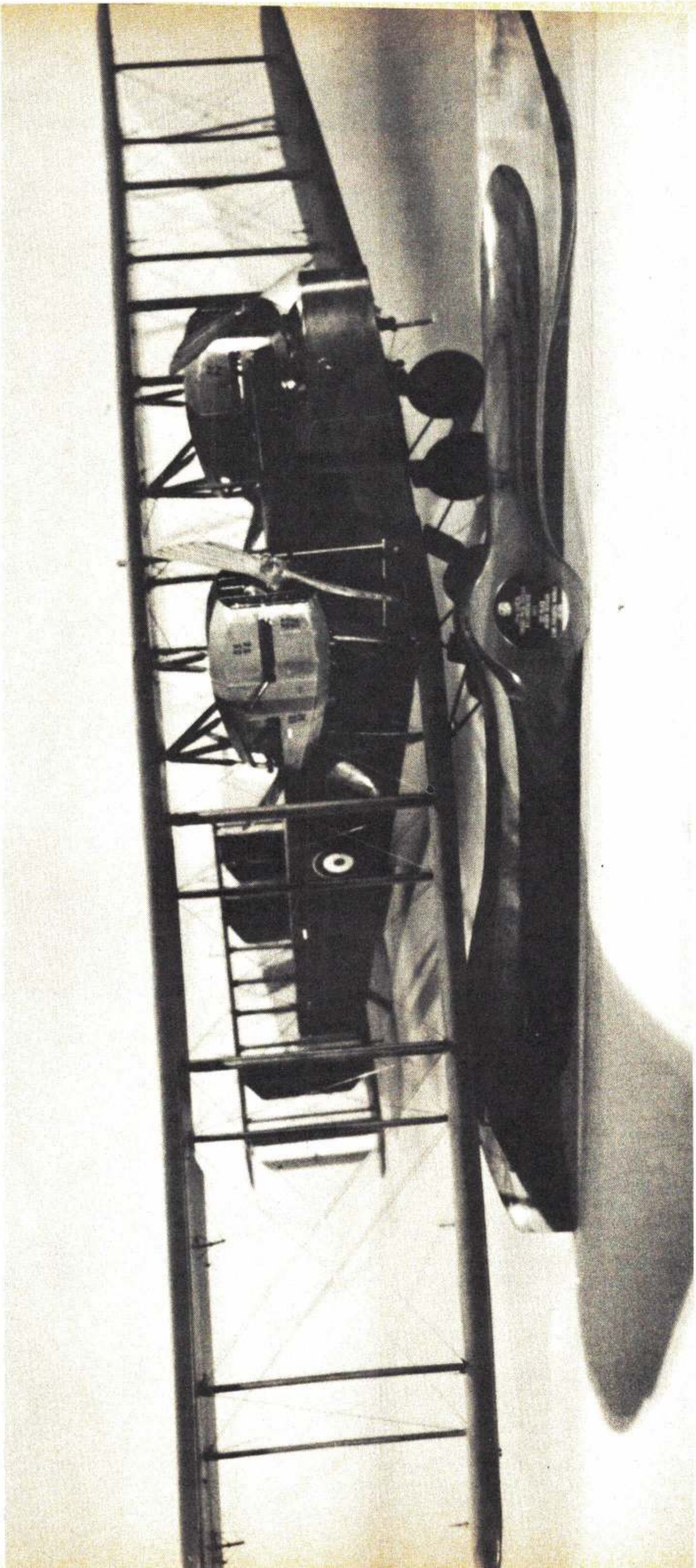
On The Line: Several methods have been discussed here for simulating overlapped metal panels using double masking tape edges against which talcum powder mixed into a putty with either fiberglass resin or glue and dope is spread. Another type of seam, those formed by butt-joined, flush surface panels or the assembly of two separate components such as a front ring of a cowl to the rear skirt can be a difficult problem. Trying to scratch these lines into the finish with a scriber or awl rips out irregular pieces of the edges and spoils the effect.

Dick Graham has developed a method which provides beautifully clear paneling lines. The model is first covered, filler coated and fine sanded. A fairly heavy layer of sealer or filler coat is recommended—a good idea from the standpoint of the finish quality anyway. Use a flexible ruler as a guide, lightly cut into the surface with an X-acto razor saw. Next, remove an old X-acto razor saw blade from its frame by bending open the back with a screwdriver. Fold a small piece of fine sandpaper over the smooth edge of the blade, holding it tightly about 1/4" from the end. Using the end as a guide, running in the previously cut saw grooves, sand down into the surface the required depth. It will be found easier on most fuselage shapes to file off the end of the blade at a slant and rounded a bit on the very end to allow the blade to be held away from the surface at a convenient angle. For best results a minimum amount of color dope should be applied over the seams. The clean edge will be lost if too many layers of dope are added. If the surface has been fully filled and fine sanded prior to cutting the seams, very little additional dope will be required for a scale-like paint job.

From The Cockpit: Hank Pohlmann has an ingenious touch of realism built into his Miss America P-51. The canopy crank in the cockpit actually opens and shuts the canopy. This was accomplished with the pinion gear and toothed rack used in the final drive of many RC servos. Most junk boxes will have one or more old servos from which the parts can be salvaged or new replacement parts can be obtained. Two or more racks can be glued together for a large cockpit opening. The edge of the cockpit is formed from K&S brass channel tubing and this provides a channel for the rack to be pulled back and forth by the rotation of the gear mounted on the canopy crank's shaft. Fasten the end of the rack to the canopy with a small metal bracket riveted in place. Conceal the pinion gear and the rack after it passes the forward end of the channel at the front of the cockpit in the side wall.

Speak Now: A number of proposals for changes in the AMA Scale and Sport Scale rules have been submitted to the Scale Contest Board for possible adoption and use in 1974. Consideration and voting on these changes will be done by mail and the in-person SCB meeting at Oshkosh. If you are interested in entering scale contests, be certain to check the Competition Newsletter summaries of the proposals. Then let your district representative (addresses appear regularly in the AMA section of **AAM**) how you feel about them. The time to do this is now, before the Nationals meetings, for a speeded up rule book schedule this year calls for final decisions by September 1st.

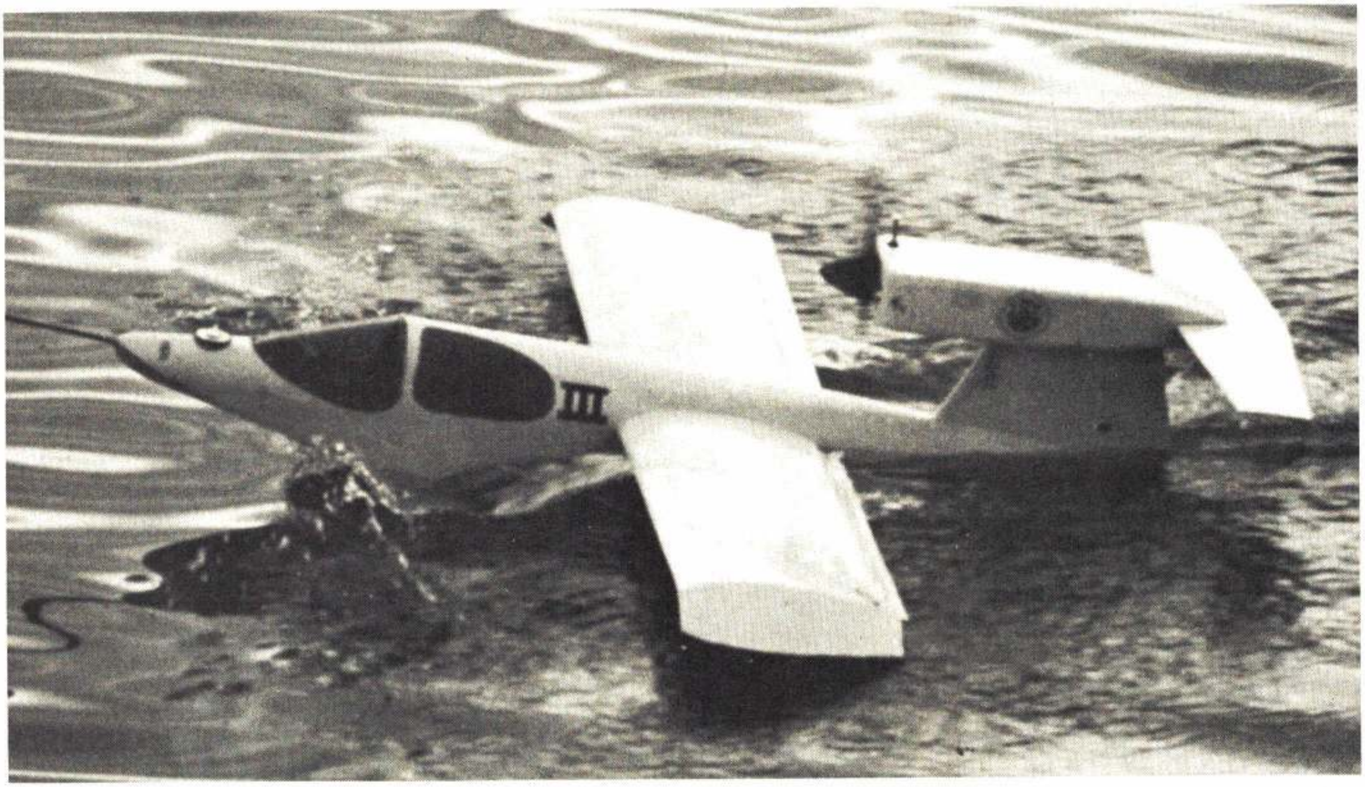




First place in World War I Scale at Toledo went to Bill Bertrand and his HANDLEY PAGE V/1500.

SPECTRA

Stand-off Scale and Aerobatic type model of a most imaginative seaplane. A small one-piece 23-40 powered plane. / by Jim Sunday



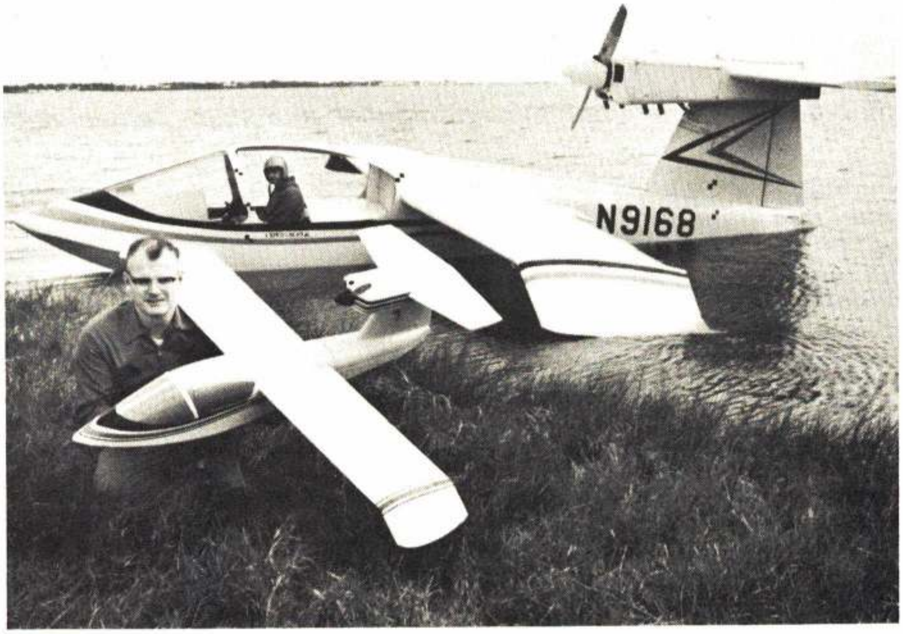
Some time ago several airplane magazines in this country and Europe featured articles on an unusual amphibian, the *Spectra*, designed and built by Leroy Lopresti of Island Aircraft Corp., Merritt Island, Florida. *Spectra* has various unique design features such as a retractable step, great visibility, wing tip floats that add to the lift and prevent water-looping, and, of course, the Loprestee tail with the engine and stabilizer mounted together high on a pylon at the rear. Its wing also acts as a very effective spray guard for the engine and prop.

At this writing the real plane has not been flown, but another model has. That model has only been flown off land and it performed well.

I have been a seaplane nut for awhile and only held out for something that was both a stunt plane and a seaplane—I just don't like flying around in big circles. The Spectra in *Air Progress* caught my fancy, so I drew the first sketches and decided to build one.

It built up very fast, and with a foam wing it was ready to fly in a couple of weeks. Now that's another story. . . .

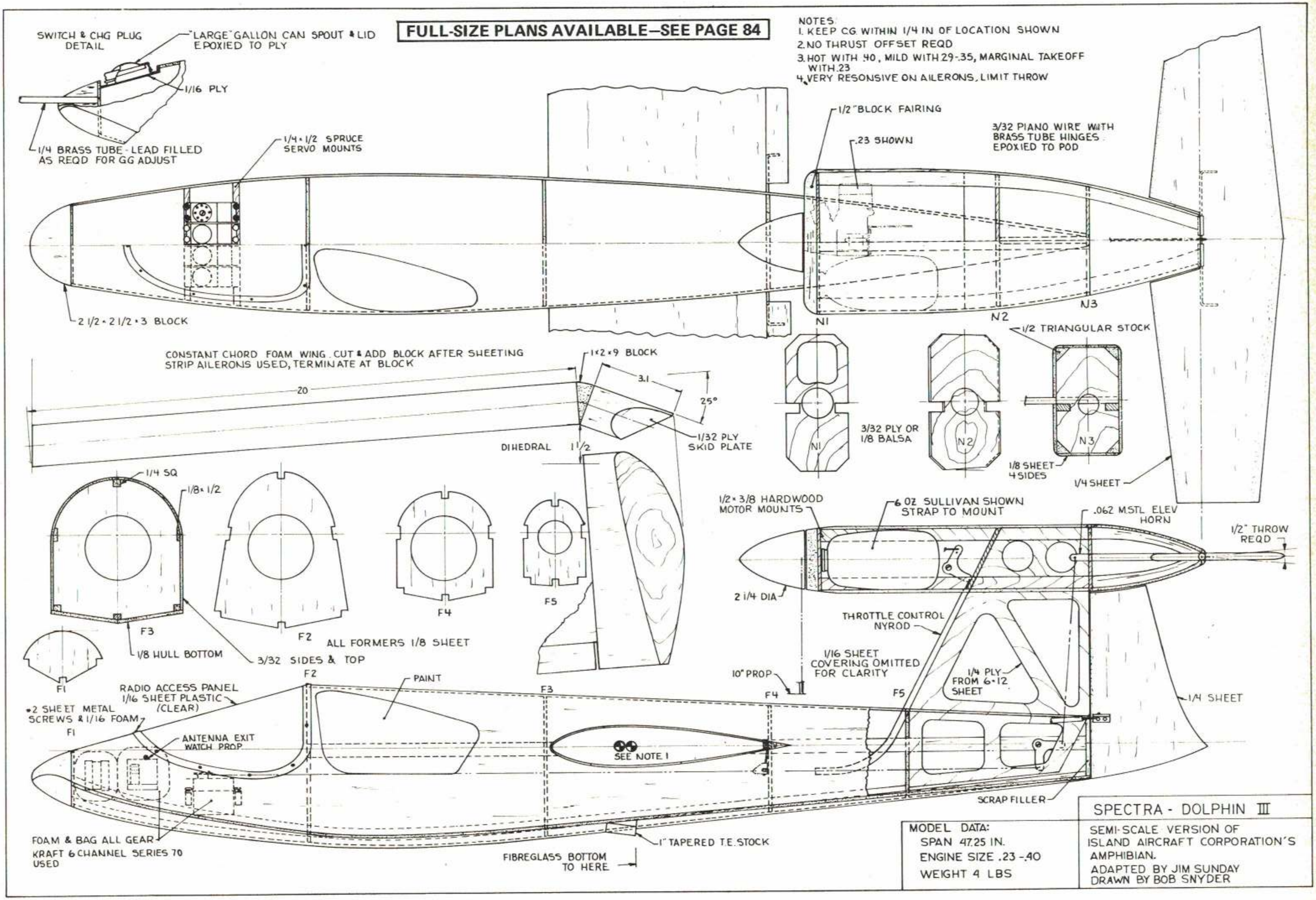
With the plane finished, I installed the gear and balanced it at about a third with a nine-in. cord. At the pond I fueled up the *Spectra* and proceeded to taxi test. It looked great in the water, floated well, and taxied just as smoothly and easily as could be. Next, I tried a run across the pond. The plane got up nicely and was real easy on the water—just straight, clean runs and no water loops.



Top: Accelerating for a takeoff, Spectra shows her clean wake and no-spray on the prop. She rides deep at the tail. Note our model features an all-flying stab which the prototype did not have. Above: Don Haines holds his RC dynamically scaled version of Island Aircraft's real Spectra. Designer LeRoy Lopresti is at the controls of the prototype.

(Continued on page 64)

FULL-SIZE PLANS AVAILABLE—SEE PAGE 84



NOTES:
1. KEEP C.G. WITHIN 1/4 IN OF LOCATION SHOWN
2. NO THRUST OFFSET REQD
3. HOT WITH .40, MILD WITH 29-.35, MARGINAL TAKEOFF WITH .23
4. VERY RESONSIVE ON AILERONS, LIMIT THROW

SPECTRA - DOLPHIN III

SEMI-SCALE VERSION OF
ISLAND AIRCRAFT CORPORATION'S
AMPHIBIAN.
ADAPTED BY JIM SUNDAY
DRAWN BY BOB SNYDER

MODEL DATA:
SPAN 47.25 IN.
ENGINE SIZE .23-.40
WEIGHT 4 LBS

SWITCH & CHG PLUG DETAIL
"LARGE" GALLON CAN SPOUT & LID EPOXIED TO PLY
1/16 PLY
1/4 BRASS TUBE - LEAD FILLED AS REQD FOR CG ADJUST
1/4 × 1/2 SPRUCE SERVO MOUNTS
2 1/2 × 2 1/2 × 3 BLOCK
1/2" BLOCK FAIRING
.23 SHOWN
3/32 PIANO WIRE WITH BRASS TUBE HINGES EPOXIED TO POD
N1
N2
N3
1/2 TRIANGULAR STOCK
3/32 PLY OR 1/8 BALSA
1/8 SHEET 4 SIDES
1/4 SHEET
CONSTANT CHORD FOAM WING. CUT & ADD BLOCK AFTER SHEETING STRIP AILERONS USED, TERMINATE AT BLOCK
20
1×2×9 BLOCK
3.1
25°
1/32 PLY SKID PLATE
DIHEDRAL
1 1/2
1/4 SQ
1/8 × 1/2
F1
F2
F3
F4
F5
1/8 HULL BOTTOM
3/32 SIDES & TOP
ALL FORMERS 1/8 SHEET
1/2 × 3/8 HARDWOOD MOTOR MOUNTS
6 OZ SULLIVAN SHOWN STRAP TO MOUNT
.062 M.STL. ELEV HORN
1/2" THROW REQD
2 1/4 DIA
THROTTLE CONTROL NYROD
1/16 SHEET COVERING OMITTED FOR CLARITY
10" PROP
1/4 PLY FROM 6 × 12 SHEET
1/4 SHEET
RADIO ACCESS PANEL 1/16 SHEET PLASTIC (CLEAR)
• 2 SHEET METAL SCREWS & 1/16 FOAM
ANTENNA EXIT WATCH PROP
PAINT
SEE NOTE 1
SCRAP FILLER
FOAM & BAG ALL GEAR
KRAFT 6 CHANNEL SERIES 70 USED
1" TAPERED T.E. STOCK
FIBREGLASS BOTTOM TO HERE

STEPHENS AKRO

Is the King really being threatened by a powerful pretender to the throne?

Is the mighty little Pitts Special actually in danger of being pushed out of the spotlight by a new aerobatic airplane, just when that glorious miniature biplane appeared to be at the height of its career?

It's possible . . . but no more than possible. The reign of the Pitts should continue for another couple of years, at the very least, for dozens of them are in the hands of the top aerobatic pilots in the U.S., along with a steadily growing number of ace aerobats in other countries. In fact, the Pitts may still be on the way up.

But it isn't the perfect aerobatic airplane, as even its most dedicated boosters will readily admit. It's basically an old-fashioned design with a few new twists, but a two-winger, nevertheless. It has bulky fixed landing gear and plenty of struts and wires, but no flaps or dive brakes or anything remotely exotic.

One of these days something is going to come along to knock the Pitts off its lofty perch. It may be here already, just waiting for a sufficiently experienced pilot. The prototype may have appeared on the scene a full six years ago—even before the first of the full-competition S-1S Pitts Specials left the ground!

So, why is the Stephens Akro so little known, while the Pitts has racked up four full seasons of undefeated flying in the U.S., and what looks like the start of a dynasty in world contests? Probably because of a combination of bad luck and the terrific momentum of the Pitts, which is now being flown by practically everyone who counts.

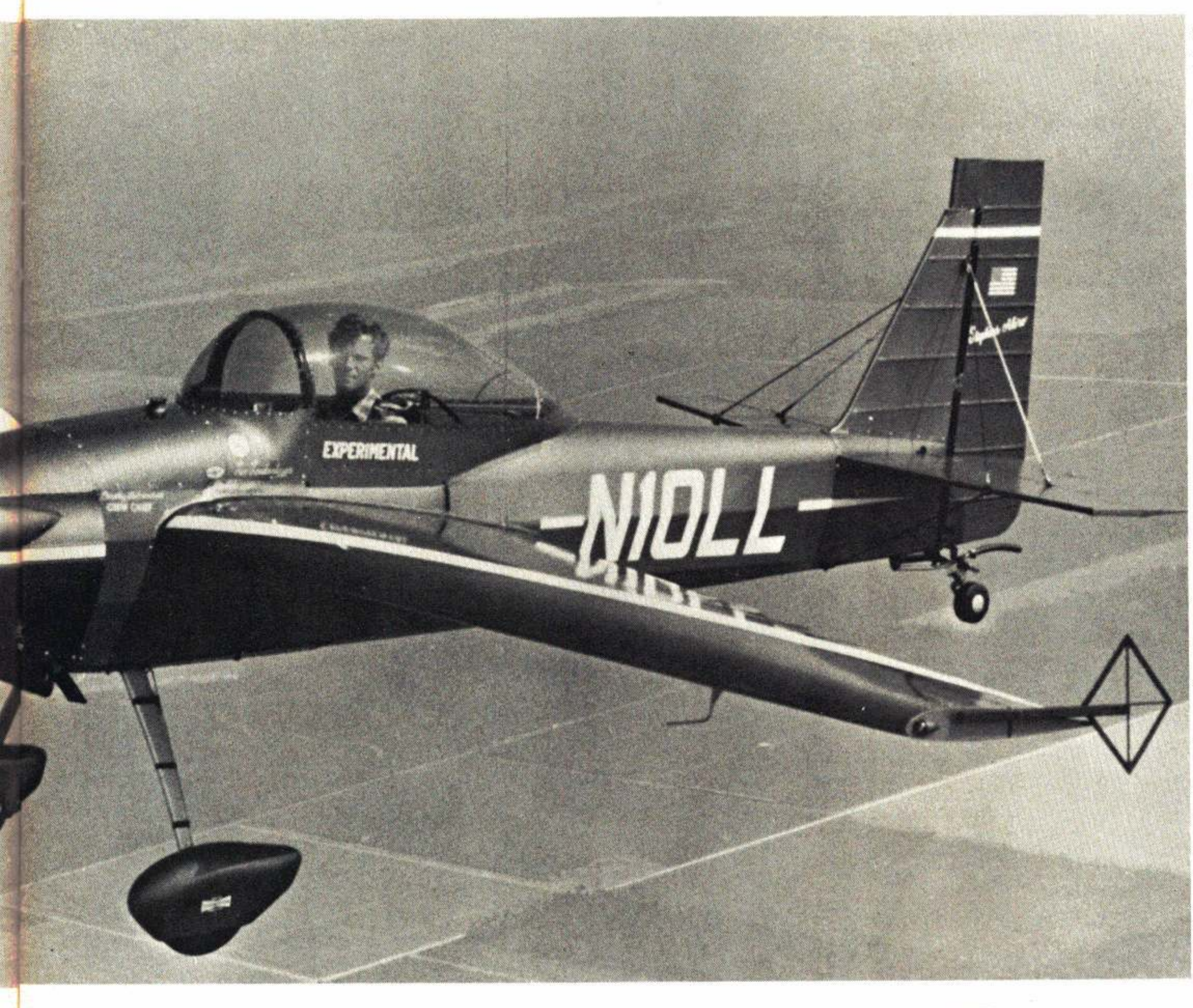
Clayton Stephens's rather homely Akro first flew in July, 1967, breezed through its test program in great shape, and almost won a national championship in its first contest. Margaret Ritchie's bright orange N3859 was just a few points behind Mary Gaffaney in the women's division at Reno in September, 1967. With more practice, Margaret was expected to do great things. But then disaster struck. Margaret apparently blacked out during a practice session, and crashed to her death. The rapid progress of the Stephens Akro came to a sudden halt. Only recently have things started to move again.

An Akro has been flown in air shows for several years by Californian Dean Englehardt (N6009V), but in this day, an airplane has to make its reputation in competition, and it wasn't until 1971 that another appeared in a contest. And then, in the hands of a complete unknown—Leo Loudenslager.

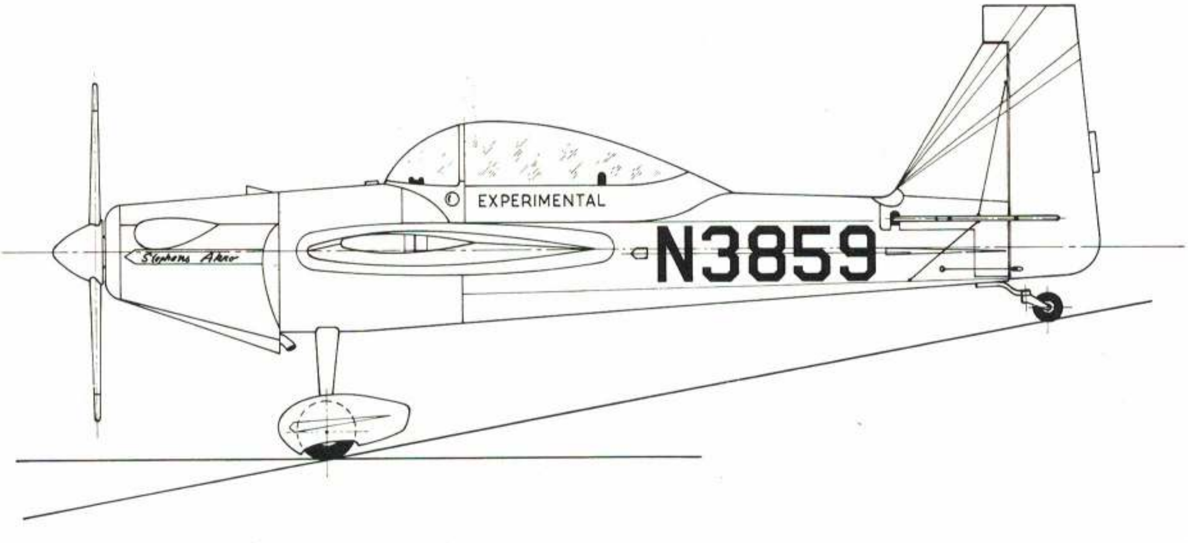
The real rebirth of the Stephens occurred in September, 1971, at Oak Grove, Texas, scene of the National Aerobatics Championships and the selection of the 1972 U.S. Team. Most of the Unlimited Class pilots were flying Pitts Specials; most of those who weren't

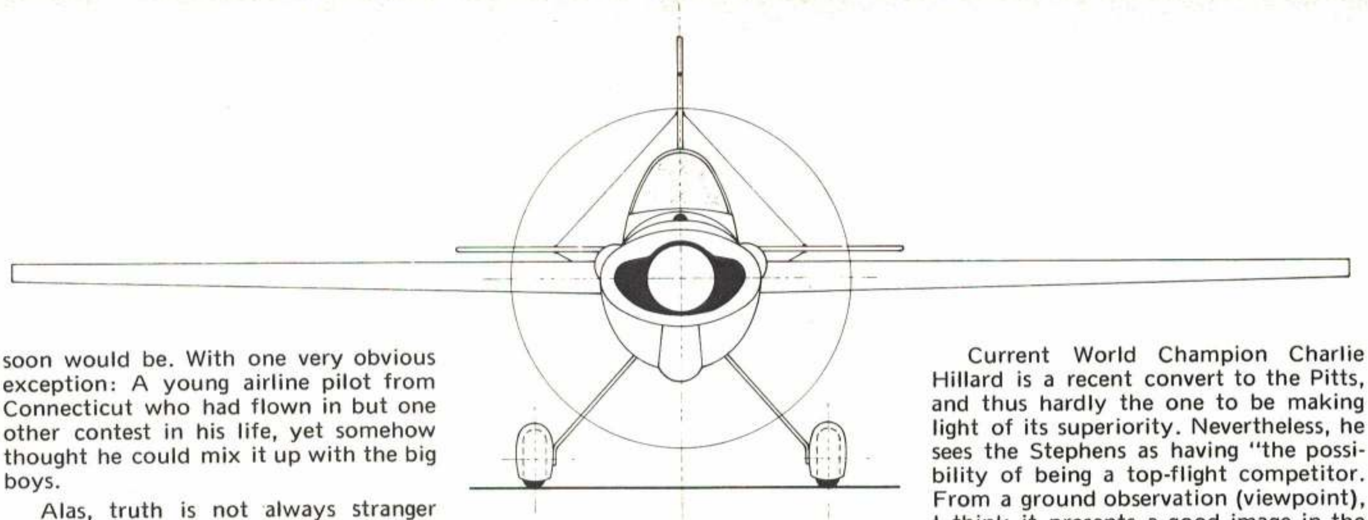
Leo Loudenslager and the Stephens Akro pose for the airborne camera of former U.S. Aerobatic Team member Bob Schneurle. The Formula One-like lines are evident in this promising aerobatic type.

Is the end of the mighty Pitts Special's dominance of World Championship Aerobatics in sight? This angular looking monoplane is the new challenger. / by Don Berliner and Bob Pauley



Photos by Ray Scholler





soon would be. With one very obvious exception: A young airline pilot from Connecticut who had flown in but one other contest in his life, yet somehow thought he could mix it up with the big boys.

Alas, truth is not always stranger than fiction. Leo didn't win the big contest. He didn't place high enough to earn a spot on the Team, even as an alternate. But he did impress the officials enough to warrant being appointed assistant U.S. Judge, which was good enough for a trip to the 1972 World Contest in France, and a lifetime's worth of experience. And he had done it in a Stephens Akro.

Leo's third contest was the 1972 Nationals where he placed fifth. That would have been good enough to gain a place on the U.S. Team, except that teams are chosen only in odd-numbered years. But the only men who beat him were veterans of international competition, and even one of them placed lower.

In a total of four contests (one for Mrs. Ritchie, three for Loudenslager), the Akro has proven itself very well. But that isn't much of a record when compared with the staggering string of national and international victories chalked up by the Pitts. It is only when the new airplane is studied carefully that its potential comes to light. The past hasn't been much for the Stephens, the present isn't very much, either. But the future could be.

For one thing, it's hard to tell how good an airplane is if the only person using it is a relative rookie. How would Bob Herendeen do in it? Or Charlie Hillard? Or Gene Soucy?

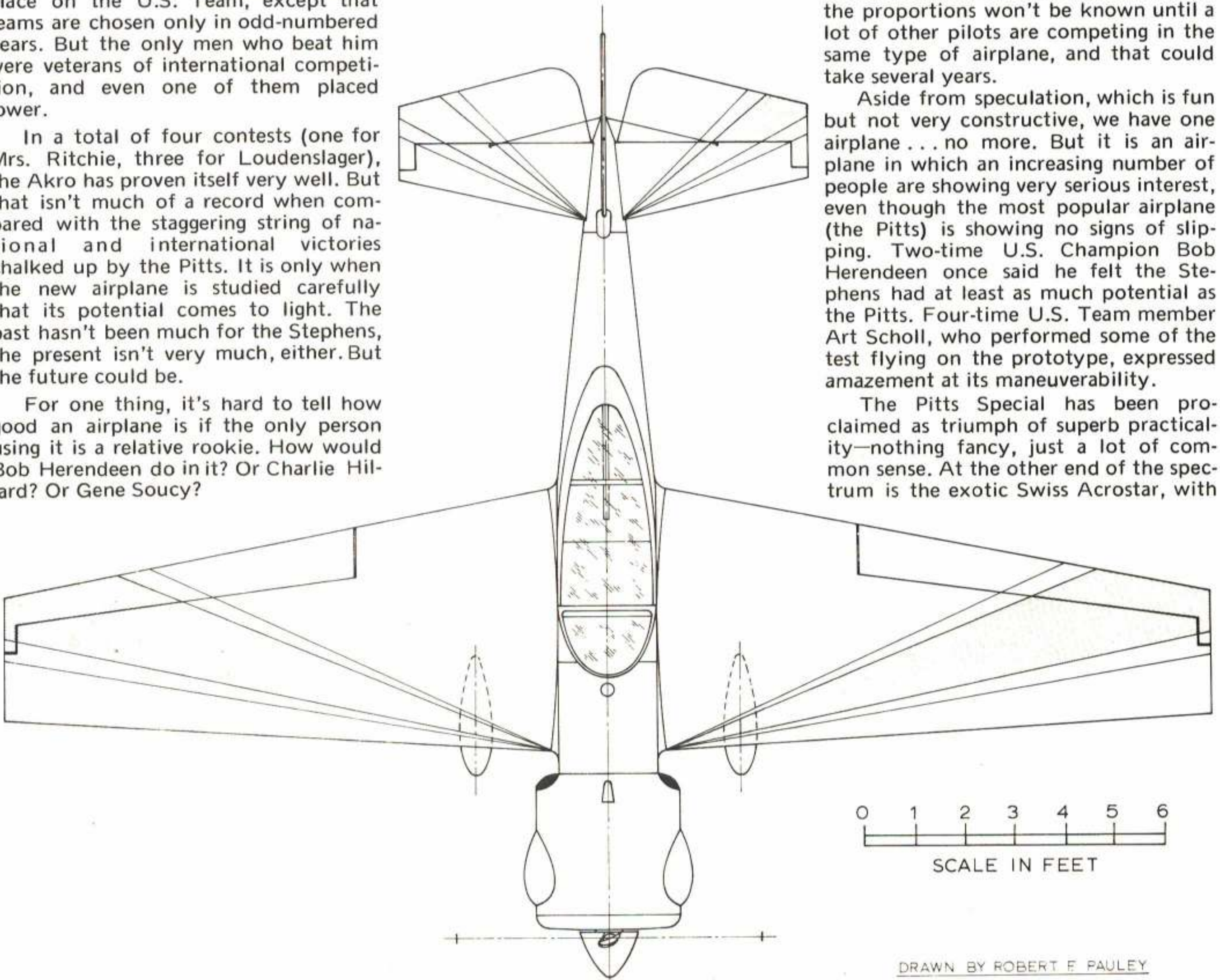
Herendeen flew the prototype, and he liked it. "The Akro handled much like the Pitts S-1S. I got in a 'Lufberry' with Margaret one day (she in the Stephens, he in his great Pitts N66Y), and she was turning inside of my circle very easily, while I was buffeting around, trying to hold it in the turn. I presume it would maneuver slower than the Pitts." Praise, indeed, from the first master of the Pitts, and a member of the first U.S. World Championship Team.

Current World Champion Charlie Hillard is a recent convert to the Pitts, and thus hardly the one to be making light of its superiority. Nevertheless, he sees the Stephens as having "the possibility of being a top-flight competitor. From a ground observation (viewpoint), I think it presents a good image in the sky." And, after all, the view from the judges' box is what really counts.

But if you want to get an enthusiastic picture of the airplane and its possibilities, talk to Leo Loudenslager, who is convinced the Stephens is the next step, and the Pitts is on the way to second-rate status. Biased? Of course! But he does know the type better than anyone else. And he has worked his way up to fifth rank in the country after just three contests. Is it Leo or is it the Akro? It has to be the combination, but the proportions won't be known until a lot of other pilots are competing in the same type of airplane, and that could take several years.

Aside from speculation, which is fun but not very constructive, we have one airplane . . . no more. But it is an airplane in which an increasing number of people are showing very serious interest, even though the most popular airplane (the Pitts) is showing no signs of slipping. Two-time U.S. Champion Bob Herendeen once said he felt the Stephens had at least as much potential as the Pitts. Four-time U.S. Team member Art Scholl, who performed some of the test flying on the prototype, expressed amazement at its maneuverability.

The Pitts Special has been proclaimed as triumph of superb practicality—nothing fancy, just a lot of common sense. At the other end of the spectrum is the exotic Swiss Acrostar, with



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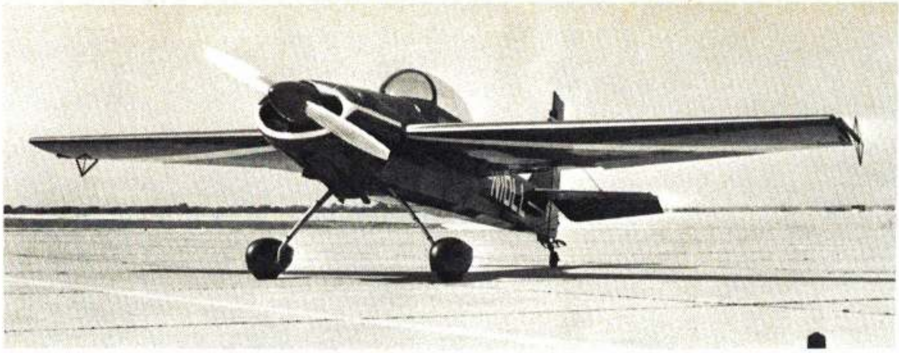
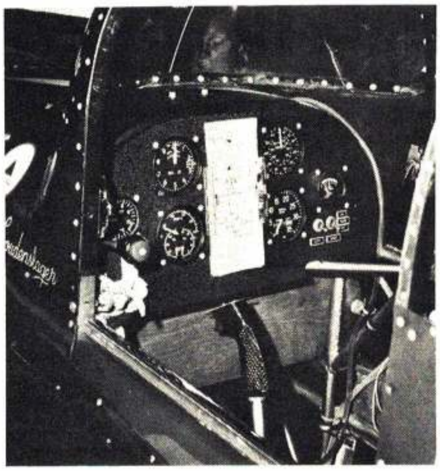
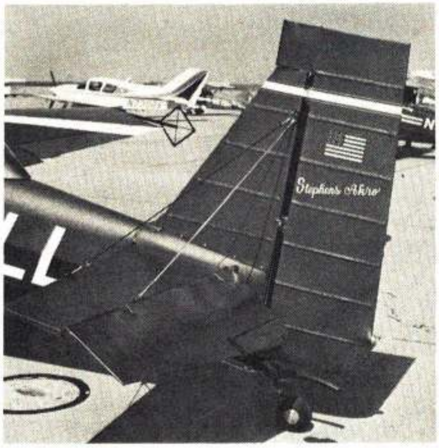
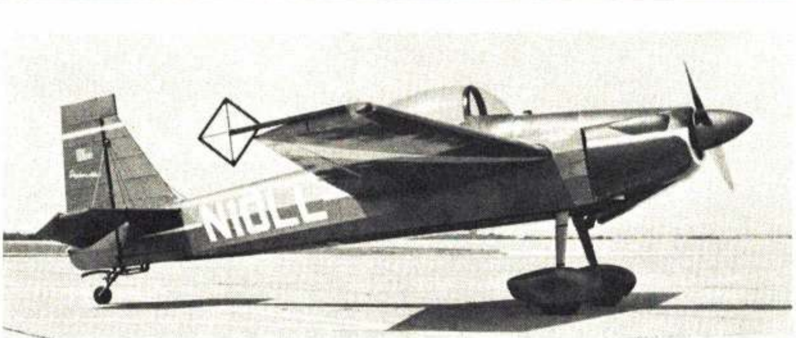


Its nose packed full of a 200 hp, horizontally-opposed, air-cooled Lycoming 0-360 engine, the premier Stephens Akro awaits the call to action. Over-the-nose visibility is the best in its class.

Right: Plenty of visibility from large blown canopy gives Stephens a definite advantage over two-winged Pitts Specials. Faint line across windshield is a horizontal reference. Below: Clustered around inevitable Aresti card which diagrams a maneuver sequence are the minimum instruments: (left) g-meter; (top) altimeter; (bottom) oil temperature and pressure; (top right) airspeed; (lower right) tachometer, (right) cylinder head temperature. Below right: Extra-heavy external tail bracing withstands the brutal forces of Unlimited category aerobatics. Note unusually close rib-stitching and oil breather pipe below rudder.







SPECIFICATIONS

Length—19' 1"
Wingspan—24' 4"
Height—5' 9"
Wing area—94 sq. ft.
Empty weight— 950 lb.

PERFORMANCE (N10LL)

Top Speed—170 mph
Cruising Speed—155 mph
Power-on stall—40 mph
Power-off stall—50 mph
Roll rate—180°/sec.

For additional data and pictures, send $2.00 for the info package to:
STEPHENS AIRCRAFT, P.O. Box 3171, Rubidoux, Calif. 92509

its coupled control system and extensive structural use of fiberglass. In between is the Stephens Akro. There's nothing exotic about it, but it's a much more modern layout than the Pitts. And certainly cleaner, aerodynamically.

The basic design is a collection of borrowed successes. The fuselage is a 1/3-scaled-up Formula One racer—namely, Art Scholl's old "Miss San Bernardino." The highly tapered wing has a common, almost-symmetrical airfoil (NACA 23012) just like the one used by Stephens on the modified Taylorcraft in which Margaret Ritchie won the Women's National Aerobatics Championship in 1966.

Construction is quite conventional. The wing is one-piece cantilever, with a full-span main spar and 3/32" plywood covering. The fuselage and tail are built from chrome-molybdenum tubing and covered with fabric. The landing gear is single-piece spring aluminum, developed from the invention of racing great Steve Wittman and made so popular by Cessna.

Power in the prototype was a 180 hp four-cylinder Lycoming. Loudenslager has upped this to a fuel-injected 200 hp Lycoming, and it is expected that newer ones may use the 220 hp six-cylinder Franklin engine. The propeller on Loudenslager's N10LL is a fixed-pitch Sensenich of 76" diameter and 60" pitch. This gives a rate of climb, under normal conditions, of 3000 feet per minute, which compares quite favorably with the S-1S Pitts and Franklin-powered Acrostar.

The 1973 aerobatics season should tell a lot more about the true worth of the Stephens Akro. While it is doubtful that more than one of the many new Akros under construction will get into action, Loudenslager promises to keep busy. He expects to compete in the big International Aerobatic Club contest at Fond du Lac, Wisconsin, July 30-August 1, and then in the U.S. Nationals, September 27-30 in Sherman, Texas. The latter will be his most important to date, for as many as 15 to 18 top Unlimited pilots will be shooting for just five slots on the U.S. Team for the 1974 World Contest. A win here will shake up a lot of Pitts fans.

In the great battle of Monoplane vs. Biplane, the first round ended in 1972 with the surrender of the two main proponents of aerobatic single-wingers. Charlie Hillard gave up on the Spinks Akromaster and bought a 200 hp Pitts S-1S; Art Scholl switched from his famous 260 hp Super Chipmunk to a modified two-seat S-2A Pitts. But the battle continues, and the second round has now begun. It pits Loudenslager and his dark blue Stephens against hangars full of Pitts Specials flown by World Champions Charlie Hillard and Mary Gaffaney; the World Championship Team of Hillard, Gene Soucy and Tom Poberezny, and a whole flock of skilled and experienced hopefuls.

But it may not be as one-sided as it looks. For even designer/builder Curtis Pitts is talking about developing an aerobatic monoplane with which to face the future. No king can reign forever.

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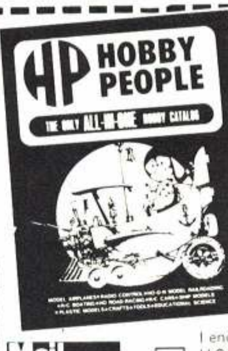

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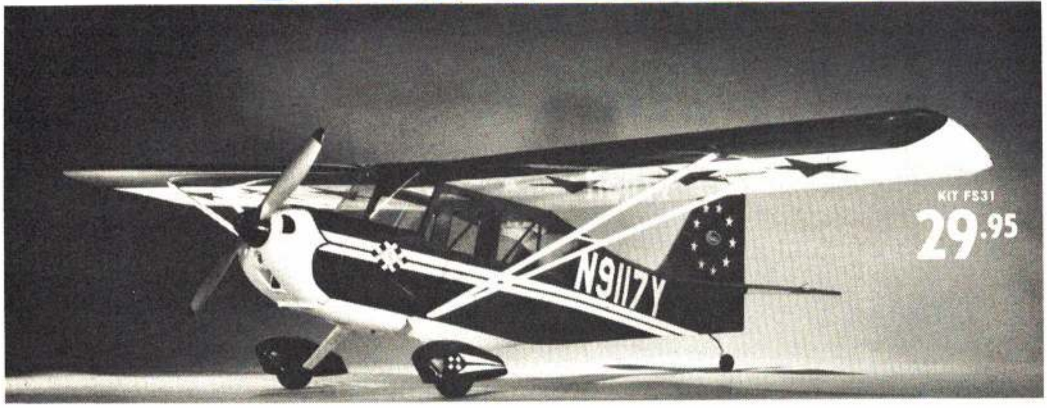

KIT FS31

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Span 54" Area 415 sq. in. Length 36" For Engines .23 to .35 Scale: 1.61" Equals 12.0"

ABOUT THE KIT ITSELF

This kit is a real joy . . . Balsa Wood is the finest grade, density-selected and sanded to micrometer tolerance; as is the imported Finland Birch Plywood. Every part is numbered to insure fast and accurate assembly as shown on the easy step-by-step plans.

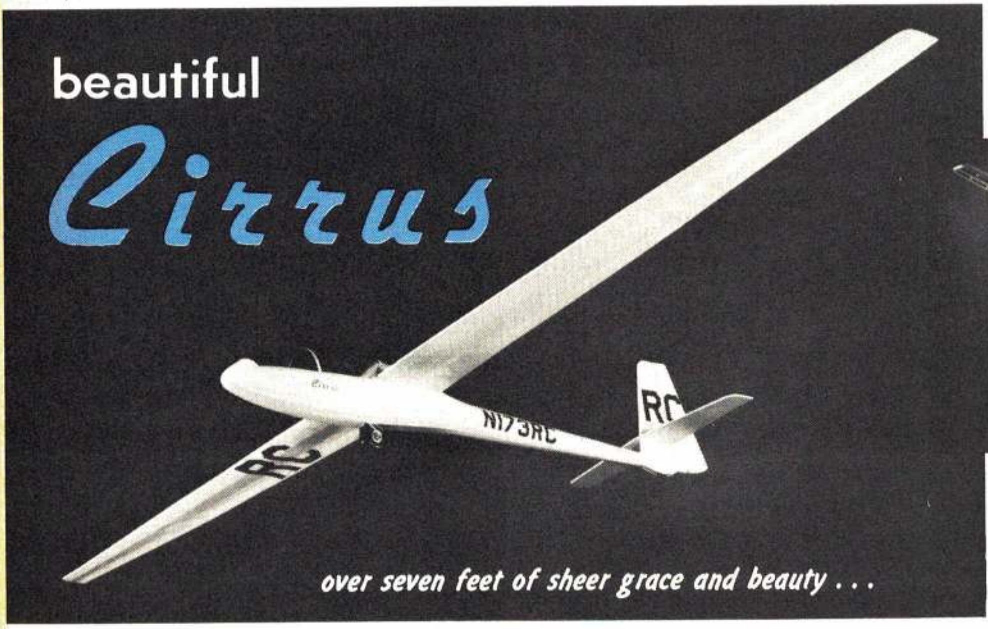
* Can be flown Control Line too—instructions on plan.

THE FUSELAGE

Fuselage sides are die cut full length. Cabin sides and inner doublers are plywood as are the firewall and landing gear bulkheads. It's easily assembled with die cut balsa bulkheads, nose block, formed music wire landing gear, custom dural engine mounts, etc. Cowling and wheel pants are rugged plastic.

WING AND TAIL SURFACES

Complete wing is built on work bench without having to remove it — so it's flat and warp-free. Parts are die cut and carved. Balsa sheet cover makes for tough wing. Wing is installed like it ought to be — with dowel pins and nylon screw in wood nut-block. No unsightly rubber bands to deteriorate, break or slip. Rudder and Stab are die cut sheet for simplicity and no warp. Included is all the linkage hardware: pushrods, aileron and elevator horns, bellcranks, clevis, connectors, etc., plus giant authentic decals, plastic windows, etc., etc.

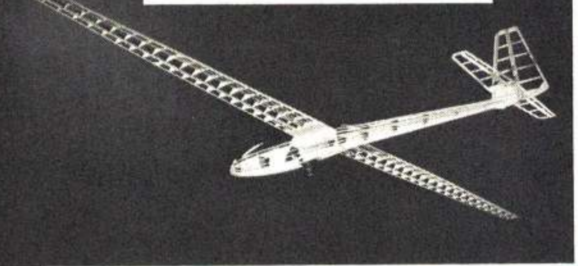


beautiful *Cirrus*

over seven feet of sheer grace and beauty . . .

STRUCTURE

Frame Photo reveals the excellence of the design engineering of the kit. Although structure is relatively simple, it is one of fine detail and great strength.



SPAN: 87$\frac{3}{16}$"
LENGTH: 37$\frac{3}{4}$"
WEIGHT: 12 oz.
SCALE: 1.5" Equals 12.0"

KIT E7

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GREAT FLIGHT PERFORMANCE

A real soaring machine is this model Cirrus. Eiffel 400 soaring wing section seeks out and takes full advantage of every thermal current. Can be flown Tow Line - Free Flight, Single Channel or pulse R/C for Slope and Thermal Soaring. Large Cockpit area provides ample room for R/C Equipment.

A FINE KIT

Top quality Balsa used throughout. All parts accurately die cut and numbered to insure fast accurate assembly, as shown on the detailed plan. Also included are shaped trailing edges, finished nose cone, giant clear canopy, authentic decals, full size plans with step-by-step drawings and instructions, etc.

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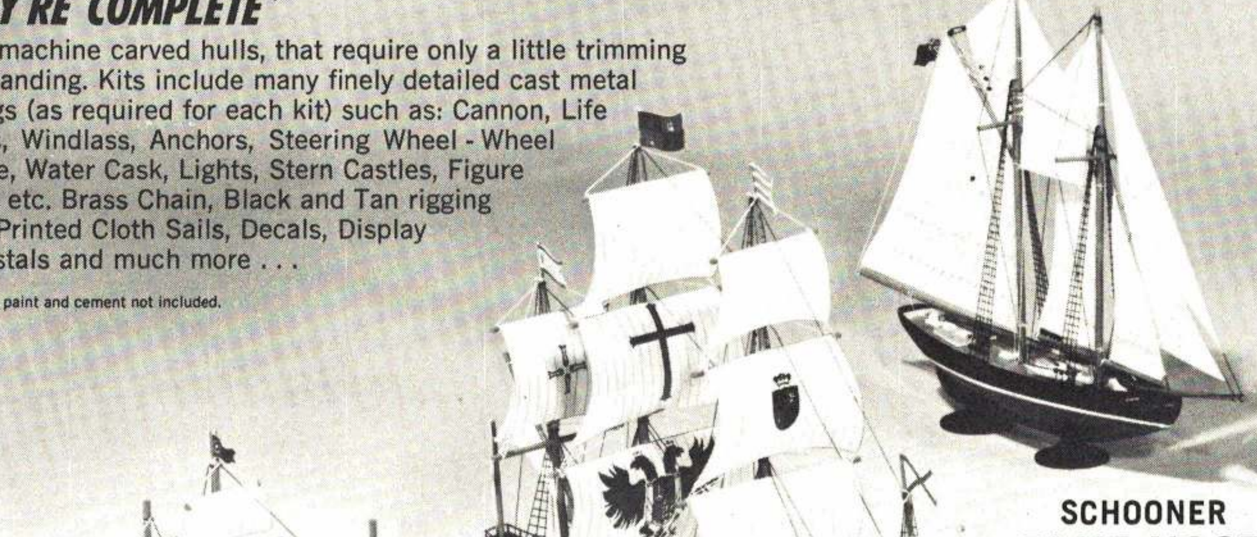

SCHOONER
BLUE NOSE
KIT G3 — Length 11¼″

SPANISH
GALLEON
KIT G1 — Length 10″

USS FRIGATE
CONSTITUTION
KIT G2 — Length 11″

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BOB STALICK ON FF GLIDERS, POWER, RUBBER, INDOOR

Around the Country by Free Flight Newsletter: There are many ties that bring free flighters together. In fact, almost an international fraternity that shares many hints and informational tidbits is something called the newsletter. The better ones are small magazines in themselves, containing club news, who-won-what-where-when, three-views, thoughtful, and sometimes irrational, articles and editorials.

A typical month brings the following pieces of information (plus much more) from the listed sources.

Diesel fuel mixture for engines used in old-timer models, complete rules for flying and building old-timer models, pictures of vintage aircraft and a S.A.M. (old-timer society) membership application from *S.A.M. Speaks*, the official publication of the Society of Antique Modelers, c/o Carl Nye, East Homer Rd., R.D. No. 1, Cortland, N.Y. 10345.

The care and feeding of Pirelli Rubber (it's called Filati rubber, now) and hints on trimming rubber models from the *Hawks Newsletter*, c/o Homer Smith, 1417 N.W. 191st St., Seattle, Wash. 98177.

Postal contest announcements and results, recommended kits for the beginner and the Junior modeler, unique designs from the active mind of young Richard Whitten in *Star Skippers*, P.O. Box 176, Wall Street Station, N.Y. 10005.

.020 old-timer rules, foam sheet free flight construction tips and how-to-do-it articles, engine flood-off modifications, stab hold-down devices, and who is building what from *The Satellite*, c/o Ralph I. Prey, 4859 W. 97th, Inglewood, Calif. 90301.

Dethermalizing a model with its stab mounted on the bottom of the fuselage, Tatone flood-off modification for quick dethermalizing action, comments on .020 old-timers. All of this covered in the recent issue of *The Dope Bucket*, c/o Mark Fechner, 112 Clinton Ave., Salt Lake City, Utah 84103.

Wakefield design opinions, several three-views, auto-stab for Coupe—complete with detailed and dimensioned drawings—dethermalizer fuse lighter design, theoretical calculations and test results on flying A-2 Nordics, plus caustic comments and down-draft awards given to those organizations, magazines or individuals who have done the most to de-emphasize or slight free flight in *Conn-Tact*, c/o Ron Evans, 83 Blake St., New Haven, Conn. 06511.

Other newsletters which cover similar materials and have a strong free flight orientation include: *T-Bug News*, c/o John Bonang, 11620-A So. Freeman Ave., Hawthorne, Calif. 90250; *The Hot-Head*, c/o Bruce Matthews, 1041 W. 58th Ave., Vancouver, 14, B.C.; *The Nor'Wester*, c/o Dale Adams, 612 S.E. 130th Ave., Portland, Ore. 97233; *WMC Patter*, c/o Bob Stalick, 1120 Shady La., Albany, Ore. 97321.

And finally, two premier free flight newsletters which all serious free flighters should receive: *Indoor News and Views*, which features all the latest in international indoor modeling, including plans, hints, gadgets, test results, pictures and more at $3.50 per year which includes membership in NIMAS plus the monthly newsletter, c/o NIMAS, Box 545, Richardson, Tex. 75080. *Freeflight*, the slick monthly publication of the National Free Flight Society (NFFS) featuring pictures, plans, monthly features on hand launch glider, rubber power, scale, technical data, assorted hints and tips, plus society news. $4.00 annually provides for NFFS membership, decals, the newsletter and more c/o FREEFLIGHT, 707 Second St., Davis, Calif. 95616.

Most of the newsletters mentioned are club efforts and are printed via mimeograph or duplicator and have a more or less regular publication of once each month. Subscription rates vary from $1.00 to $2.00 per year. Even though those mentioned do not represent a complete list, they are representative of the newsletters currently on the free flight scene and worthy of your support. Since all of them depend upon donated services at no pay, time schedules and formats are not always vigorously held, but all are outspoken, timely, and on the cutting edge of what is most recent in free flight developments. All are helpful to the free flighter—beginner and expert alike. Often what is read in this column and others appeared first in a newsletter. Long may they live!

JOHN BLUM ON CL CARRIER

Jets For Carrier: Jerry Farr of Abilene, Texas asks why models of jets can't be considered for use in Scale Carrier, but powered conventionally? This requires a rules change, of course, but is food for thought and will no doubt shake the "purists."

The sketch shows the Skyhawk and the Fury. He also suggests the Crusader which is now kitted in profile. Profile offers unlimited opportunities for model selection, but performance will dictate modifications. Wing area, proportionally, wing location and configuration will offer problems due to lack of a more forward position. However, look-alikes are unlimited. Here, again, is the preference line between the Scale-Carrier fliers and Carrier-Scale fliers.

One More Carb: Sketch of dual-carb on a K&B 40 based on approach to more effective high and low speed by Dave Gierke. The basic idea is to operate one carb, the small one in front, for the slow speed, both carbs simultaneously for high speed. As the model reaches slow speed, the rear carb closes off and the final throttling is done on the front carb, at just past the halfway mark. There is an explanatory discussion offered in the May 1968 issue of **AAM** by Harold deBolt. The article presents experiences and procedure.

The system could be coupled with pressure fuel feed and fuel-metering or fuel regulation. It presents another approach to Carrier engine setup enhancing last month's descriptive technique by Terry Herron.

Although the sketch depicts a K&B 40, the approach might be applied to most all engines with similar removeable parts. The research is left to you.

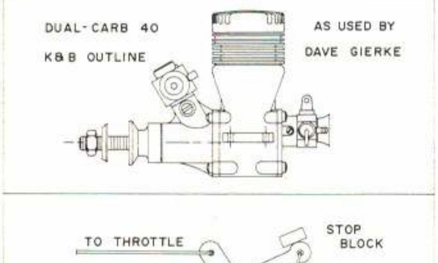
More Throttle Cranks: Carl Jantz, of Johnson City, N.Y., has been watching the custom throttle bellcranks that have appeared here. He feels the one shown in the sketch is an improvement over other ideas.

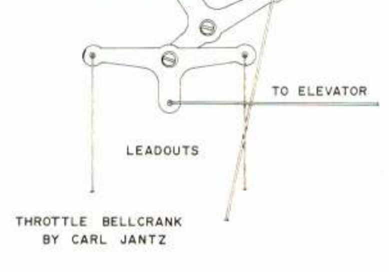
The construction parallels others shown using two smaller (two in. approx.) bellcranks in the depicted position. The throttle crank has been shortened about 30% of one half its length.

Custom cranks shown so far and the purchased type give a forward movement to the throttle pushrod. Most factory throttled engines require movement in the opposite direction. Thusly, he reverses the elevator crank to avoid pushrod interference, assembles the crank as shown and has an assembly that moves in relation to the engine.

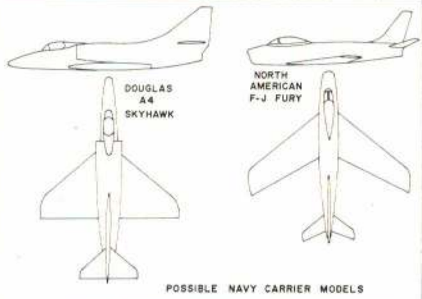
A word of caution! Although those who have presented the ideas on these inexpensive custom throttle bellcranks have not specified specific use, it is the author's suggestion that their use be confined to Profile Carrier and/or lighter, slower aircraft. These units, as modified, are not intended to possess the strength required for the hotter Class I and II models.

Column Participation: Add your thoughts, ideas, and comments to this column by writing John Blum, 2417 Glen Pl., Granite City, Ill. 62040.





THROTTLE BELLCRANK BY CARL JANTZ



POSSIBLE NAVY CARRIER MODELS

HOWARD RUSH ON COMBAT

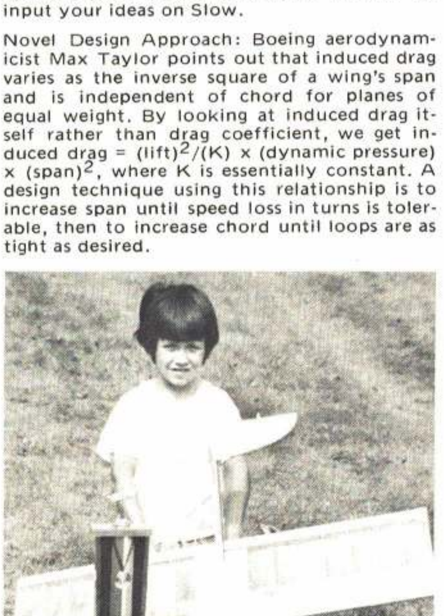
Glow Plug Seals: It's hard to find a glow plug that will hold up in a high-compression, high-nitro environment. Ron Sheldon, California Combat ace, strengthens the seal on Fireball plugs with Hysol Epoxipatch Kit No. One, an industrial epoxy. For best results, the plug should be heated before applying the epoxy. I put plugs in a frying pan over low heat, dabbed on the Hysol between each plug's stem and body, then cured it in an oven for an hour at 200°. Resultant seals withstood 65% nitro in a Supertigre 35, more nitro than the crankshaft could take. Ron adds polyester pigment to the epoxy to color code the plug heat range.

Fuel Mixing: To get any intermediate nitromethane concentration by blending a high-nitro fuel with a low-nitro fuel, use this recipe: (% nitro of hot fuel - % nitro desired) parts of mild fuel + (% nitro desired - % nitro of mild fuel) parts of hot fuel. For example, to get 25% nitro using 40% as the hot and 5% as the mild fuel, mix (40-25)=15 parts of 5% and (25-5)=20 parts of 40%. This is equivalent to 3 parts of 5% to 4 parts of 40%. Mixing a tankful at a time with a graduated plastic disposable syringe makes on-the-field experimenting easy.

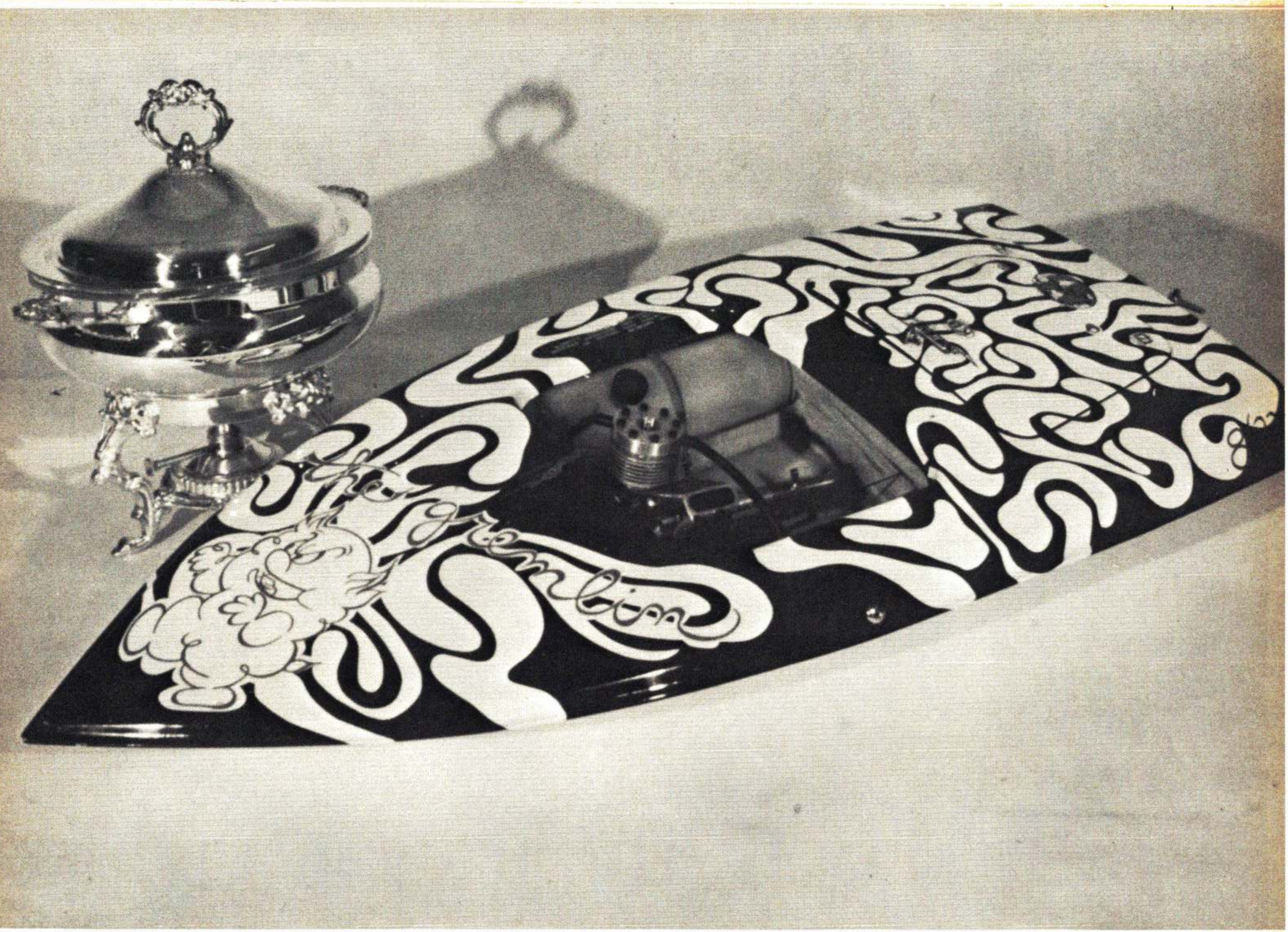
FAI Combat at the Nats: Pending final AMA approval, FAI Combat will be held afterhours at the 1973 Nationals. Dick Mathis will sponsor the event again and the MACA will conduct it. Entries will be accepted at the scene. For details, write Rich Ryon, CD, 4006 Pippin, Lafayette, Ind. 47901.

Official Slow Combat Rules: The AMA will include Slow Combat in the 1974 rule book. Contact your CL Contest Board member to input your ideas on Slow.

Novel Design Approach: Boeing aerodynamicist Max Taylor points out that induced drag varies as the inverse square of a wing's span and is independent of chord for planes of equal weight. By looking at induced drag itself rather than drag coefficient, we get induced drag = $(\text{lift})^2/(K) \times (\text{dynamic pressure}) \times (\text{span})^2$, where K is essentially constant. A design technique using this relationship is to increase span until speed loss in turns is tolerable, then to increase chord until loops are as tight as desired.



Seven-year-old Nick Servizzi of Cincinnati took second in the unofficial Junior Slow Combat event at the 1972 Nationals.



The GREMLIN, by Marianne Preusse, took second place in the Racing Boat category at Toledo.

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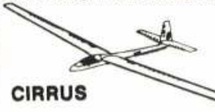

CIRRUS

RETAIL $79.98 TOWER PRICE $39.00

KWIK FLY MK III

This is the world champion model designed by Phil Kraft for acrobatics. Wing span of 59½ inches and will take up to a .60 for 4 channel RC equipment. This model is easy to build due to its extensive prefabrication.

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G60 RC Bluehead	69.98	55.95
VECO		
.19 RC	$ 31.00	$ 21.75
.61 RC W/Perry & new muffler	74.95	52.50
WEBRA:		
.40 RC Blackhead	$ 81.50	$ 52.00
.60 RC Blackhead	109.00	69.75

HOBBIES

ILLINOIS 61820 PHONE 217—356-4294

POWER . . .

	RETAIL	TOWER PRICE
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RCM Basic Trainer	$ 27.95	$ 20.50
RCM Trainer	44.95	35.50
RCM Trainer Wing Kit	21.95	17.50
Kaos	49.95	39.00
Kaos Wing Kit	24.95	19.75
Super Kaos	57.95	42.50
DUMAS:		
Triton	$ 39.95	$ 29.00
Mod Pod	16.50	13.00
Evolution/2	14.95	11.00
Sport Evolution	21.95	16.00
Hi-Lo Evolution	22.95	17.00
GOLDBERG:		
Falcon 56	$ 19.95	$ 13.95
Senior Falcon	36.95	25.50
Skyland 62	36.95	25.50
Skylark 56	22.95	16.75
Ranger 42 ARF	19.95	13.95
Shoestring 54	29.50	20.75
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Me-109	$ 59.95	$ 38.00
Comanche	54.95	35.00
Mooney Chaparral	54.95	35.00
Sierra Trainer	44.95	28.50
Cassutt Racer	29.95	19.50
Mini-Comanche	29.95	19.50
Cricket	16.95	11.75
J & J:		
Mark V Eyeball	$ 54.95	$ 42.50
J-Craft	45.95	32.00
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Banshee	54.95	38.00
JENSEN:		
Das Ugly Stick	$ 49.94	$ 39.00
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MIDWEST:		
Mach 1	$ 49.95	$ 34.00
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Esquire	15.95	11.00
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P-39 Airacobra	$ 49.95	$ 33.50
P-51 Mustang	45.00	30.00
P-40 Warhawk	49.95	33.50
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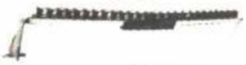

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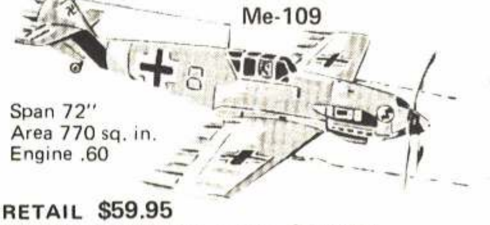

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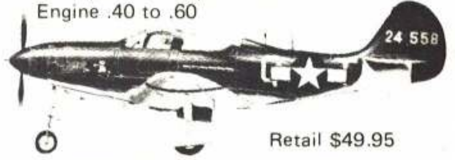

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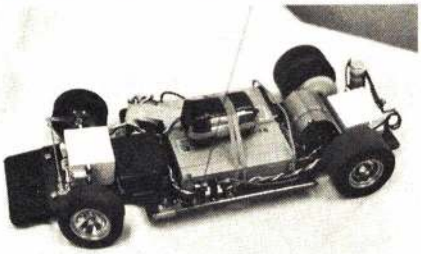
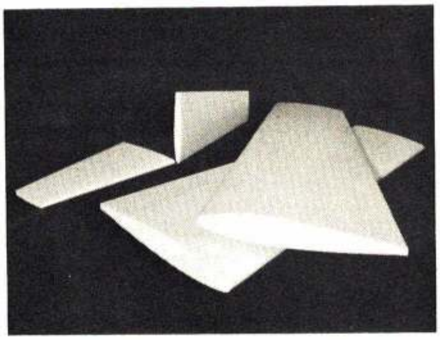


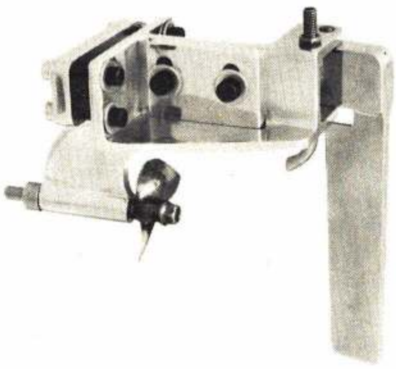
Bolink Industries/Electric Car. This 1/12th scale electric car is powered by a 12 volt Mabuchi motor with two 6 volt 1.2 amp batteries. The car comes in three body choices—Camaro, Mustang, and Challenger—complete with all components plus radio control system. Electric power has obvious advantages over gas—it is able to run on indoor surface, is easy to start, and is reliable. Cars will be in limited quantity. $62.50. Bolink Industries, Box 80653, Atlanta, Ga. 30341

Cal Aero-Model/*Brooklyn Dodger*. This model is scaled-down replica of the Old-Timer classic design for competition in the 020 class. This type of model is gaining popularity in all age groups of fliers and has won several major contests to date. The all-balsa kit includes sharply die-cut wood, and an 8½ x 11" adjusting and flying sheet provides reference for the first flight out in the field. Cal Aero-Model, 7142 Bluesails Dr., Huntington Beach, Calif. 92647

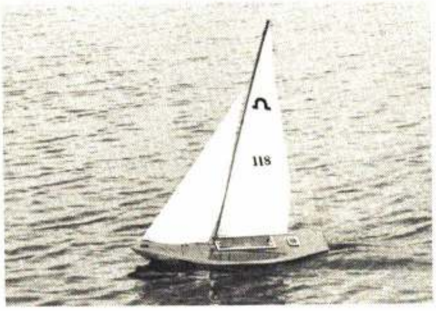


T & L Glassflite/Fiberglass Wings. These new precision machine-cut core wings have an epoxy resin laminate over the foam to create a very rigid and tough surface. The wings are presently available for some 30 popular models and all wings have strip ailerons. Price is $24.95. Retract cut-outs are $3.00 extra. Matching fiberglass stabs are also available for $7.00. T & L Glassflite Wings, 20408 71st East, Sumner, Wash. 98390

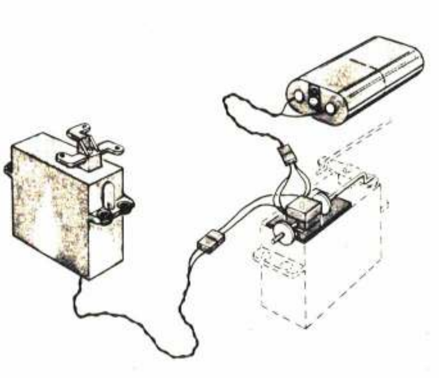
Sig Manufacturing/*Mr. Mulligan*. Another in the Sig Classic Series, this 20-in. wingspan free flight plane is a nice flying semi-scale model. The kit includes propeller, wheels, building and flying instructions as well as covering material. $2.95. Sig Manufacturing Co., 41 South Front St., Montezuma, Iowa 50171



Marine Specialties/Variable Outdrive. This new unit incorporates the drive unit and rudder bracket into one rigid assembly. This simplifies the hull construction and provides for a thrust line adjustment to insure proper trim. Two types of struts are available for mono and hydro hulls. The mono strut places the propeller even with transom and the hydro strut places the propeller 1/2-in. behind the transom. Assembly is also available with two sizes of rudders for 19 and 40 class boats. Retail price is $19.95. Marine Specialties, P.O. Box 588, Saratoga, Calif. 95070.

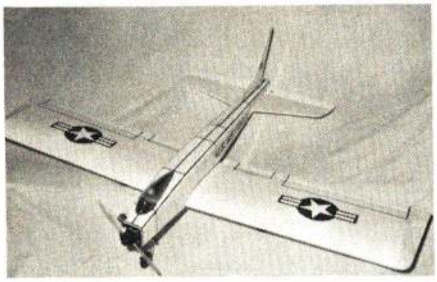


Hartman/50-800 Yacht. The latest fiberglass fabrication from Dwight Hartman is this fiberglass yacht hull designed for sport sailing or racing in the 50-800 Open class, as the hull length is 50 in. and the sail area is 800 sq. in. Basic fiberglass hull is $24.00 with many optional parts available to complete the kit. Hartman Fiberglass RC, 233 Melrose St., Argenta, Ill. 62501



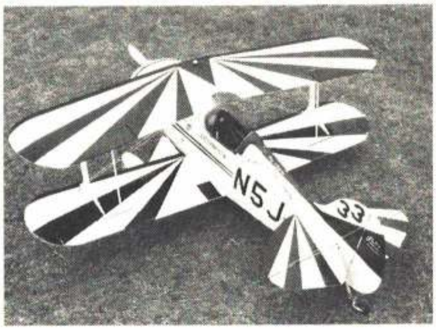
Carl Goldberg/Retract Power System. A new actuation system for mechanical type gear consists of a servo, battery pack for two penlight AA cells and micro switches. The system is designed to allow modelers with four-channel radios to fly with retracts as the servo operates off two micro switches mounted on a plate on top of the motor servo. The retract servo is extremely powerful and will easily handle tri-gear operation. Complete system is $29.95. Carl Goldberg Models, 2545 West Cermak Rd., Chicago, Ill. 60608

Southern RC/*Bobcat*. Designed to meet the current trend of 40-sized airplanes, this new ship is an 80% version of Ron Chidgey's *Tiger Tail*. Kit has a balsa fuselage with pre-cut sides and formers and includes balsa to cover foam wing cores and stabilizer. Southern's Sorghum contact cement and Skyloft covering material are also included in the kit along with a hardware package. Wingspan is 52 in., area is 450 sq. in. $48.50. Southern RC Products, 8685 North Palafox Hwy., Pensacola, Fla. 32504



Neal's Hobby Manufacturers/The Jet Set. These all-balsa RC trainers are designed to make learning much easier and more fun. They are very versatile as they can use from 19 up to 40 engines. The model is available in two versions: a shoulder wing Pal-Z for $28.00 and the low wing Zenith for $29.95. Kit features contest grade balsa plus pre-bent landing gear, canopy, and full-size plans. Neal's Hobby Manufacturers, 4409 Mt. Mahoning Ave., Warren, Ohio 44483

Terry Plane/*Thor II*. An updated version of the original Thor, this 62-in. span bird is for the novice and sport flier alike. For 15 to 29 power, the plane is large, light and stable and will accept one- to three-channel radio. Kit contains quality balsa and two full-size plan sheets and a very complete accessory package. $28.50. Terry Plane, Inc., Box 2429, Orcutt, Calif. 93454



Bob Holman/Fiberglass Fuselage. The famous *Pitts Special* is accurately captured in a fine scale fuselage. The model is a ¼ full-size 52 in. span, 60-powered ship for which plans are available from the manufacturer. Fuselage sells for $39.95. Bob Holman Plans, P.O. Box 741M, San Bernadino, Calif. 92402

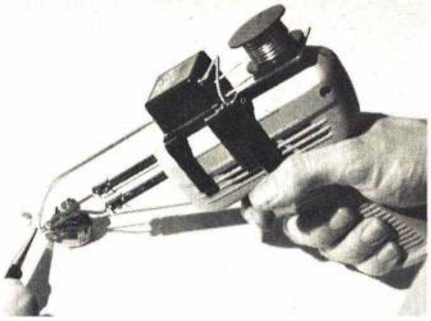
Space Age/Balloon. Is it for real? Yes, this is a 12-ft. model hot air balloon kit containing 15 pre-cut panels on No. 1 model paper, ring for bottom of balloon, top tie-on cord and complete instructions for assembly, inflating and launching. Balloons are extremely safe and can be launched with a common butane torch to rise several hundred feet. Will carry a payload of up to 1/2 lb. $5.00. Space Age Distributing Co., 421 Fontenelle, SE, Grand Rapids, Mich. 49508

Moody Kit

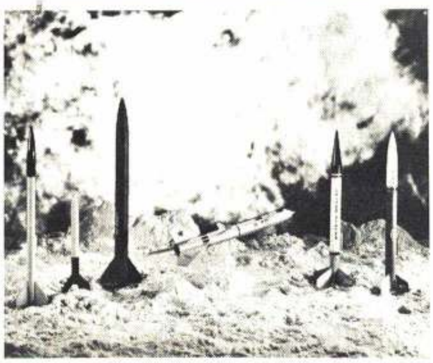
SC-5 Screw Driver & Awl Set

Moody Tools/Screwdriver Kit. A tiny tool kit contains four heat-treated screwdriver blades in sizes .055, .070, .080, .100 and an awl. Tools fit interchangeably into a chuck type handle with narrow finger grip and swivel top. The screwdriver and awl kit sells for $2.50. Moody Tools, 42-46 Dudley St., Providence, R.I. 02905

Dumas Products/*Mark II*. The latest from Dumas in their line of racing boats, this improved version of the *Drag'n Fly 40* should prove to be a winner in all-out speed and maneuverability. A beautiful looking craft, it is built from an all birch plywood kit. Price is $38.95. Dumas Products, Inc., 790 South Park Ave., Tucson, Ariz. 85719



Schurman/Solder Feeder. Latest device from Schurman Products allows modelers with a motion of their thumb to actuate a solder feeding mechanism to measure both solder amount and rate. Easy to use, the feeder can be set up for either right- or left-hand use on your present solder gun. The easy loading spools hold 20 ft. of standard .062 in. solder for extended use. A free spool of ten ft. is provided with each unit. $8.95. Schurman Products, P.O. Box 13, Weymouth, Mass. 02188

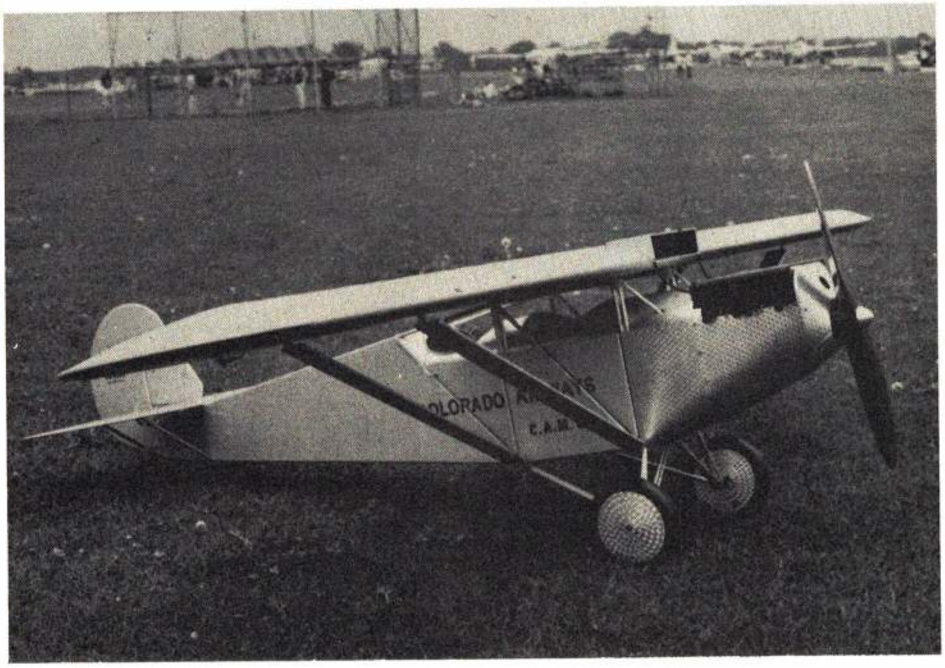


Estes/New Mini-Brutes. Introducing five new model rocket kits to Estes's Mini-Brute fleet. The models are designed for exciting flying with small body diameters and powerful engines. The new kits are the *Javelin-Super Flea, Little John, Wolverine, Rogue* and *Aero Hi.* All of these miniature sized rockets sell for under $2.00. Estes Industries, Box 227, Penrose, Colo. 81240

Aristo Craft/Frontier Type One. Another in Aristo Craft's line of entirely foam airplanes, this kit is very quick to build due to the extensive prefabrication through the use of molded foam parts. The model is very simple to build, thus being ideal for beginners. It has a flat-bottom airfoil and tricycle gear. For one- to three-channel radios, $19.95. Aristo Craft Distinctive Miniatures, 314 Fifth Ave., New York, N.Y. 10001

SIG SUPERCOAT DOPE - T

WINNER OF THE TWO



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Picked from the models of 1400 of the nation's best builders, the true-to-scale effect on the Ryan M-1 Mailplane was achieved by the use of Sig Lite-Coat Dope to which silver powder had been added. Because of the built-up construction of this radio-controlled beauty, Ed wanted a dope that would not pull up the covering excessively. He comments, "Lite-Coat is the greatest! Not one warp appeared. I have tried other major brands but Sig is what I use and recommend." The Ryan was built from Sig balsa, plywood and spruce and although large, weighs only 8-3/4 lbs. and has a light wing loading. Ed has also used Lite-Coat thinned 50-50 and applied with a brush on Japanese Tissue covered free-flight models without any sign of warping or twisting.

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1973 TOLEDO CONFERENCE

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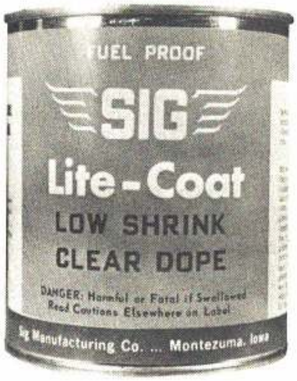
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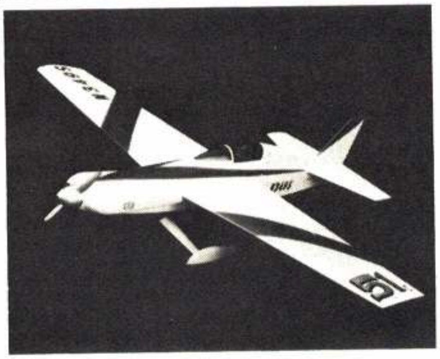
MISS DARA

BOB BROWN



This kit contains a very useful detailed instruction booklet. The plans provide a clear view of construction. Time is well spent reading the booklet and plans before beginning construction.

The epoxy/fiberglass fuselage weighs only 11 oz. The glass layup is very clean and requires little filling and sanding. The firewall is not positioned and enables the builder to set up the thrust angles. Any commercial metal engine mount can be used on the firewall. The fuselage provides plenty of room for the engine, radio and fuel system. The entire right cheek cowl is removeable via a cam-loc, a valuable feature in adjusting the fuel system or engine.

The wing is a foam core sheeted with 1/64 plywood. The leading edge of the wing is spruce and helps provide the strength needed in the high "G" turns. The center section is glassed for additional strength. Brass and aluminum tubing is supplied for the torque rod. The inset ailerons provide a neat, efficient setup which is free of high-speed flutter. The hole in the wing for the aileron servo must be made according to the instructions, otherwise it is impossible to install the servo.

The stab, elevator and rudder are solid balsa, but have a 1/64 plywood strip embedded in the leading and trailing edges. When properly sanded, this produces a very sharp, neat leading or trailing edge.

The landing gear is pre-bent 5/32 wire. The one-piece sheet metal flarings shown on the plans work very well. Solder only the lower portion of the flaring to the landing gear. The fiberglass wheel pants are held in place with a special brass collar supplied in the kit.

Radio installation is conventional, but one should be careful in obtaining the optimum balance. Servo rails are easily glued to the fuselage with a silicon glue. A 225 ma NiCad battery pack can be used if less weight is desired.

Flight characteristics are typical of a Formula One aircraft. Takeoffs require a slight amount of rudder and a little up elevator. Make sure sufficient air speed is acquired prior to lift off. Landings are "hot" but should produce no unusual problems.

This kit produces one of the finest airplanes I have had the pleasure to own.

Specifications: Engine Size—40; **Wingspan**—47 in.; **Wing Area**—470 sq. in.; **Length**—40 in.; **Weight**—5 lbs.

DEMBROS STAR-FLITE

FRED MARKS

The Set: Four channels controlled by two sticks. Available on 27 MHz and 72-76 MHz frequencies. Manufactured by Cannon for Dembros as a one-line, low-cost system.

System Features: Use of World Engines IC servo amplifier to permit use of two-wire battery pack, three-wire servo. Lightweight, uses D&R servomechanisms. Built-in charger, nickel cadmium batteries used for both transmitter and receiver.

Transmitter: Uses all discrete components. Encoder board contains free running multi that sets frame rate at about 70 frames/sec., four half shot multis for controls, and the modulator. RF section is on a separate board and uses inductive/capacitive tuning for the oscillator, interstage and final tuned sections. Rand two-axis sticks are used. Power is 9.6 volts from 500 mah nickel cadmium cells.

Receiver: Single deck construction. Single-conversion receiver has double-tuned front end. Three transformer IF, molded plastic case. Discrete components for decoder shift and sync pulse forming. Uses two flat pack IC dual J-K flip-flops for decoding four functions. Deans plug-block system used for power and servos.

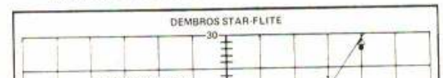
Servos: Three wire IC servo using World Engines/Signetics IC. Fifteen external components. Rotary output.

Tests: Flight tests in a Pilot Box Fly were satisfactory. Bench tests of 0°F to 150°F were satisfactory. Overall Evaluation: Equivalent to most of the "House" sets manufactured for discount houses. Price set by limiting the options available. According to Dembros, has a 90-day warranty, choice of any of the three D&R mechanisms will permit more servo power, rack output if desired. A good system for the economy minded sport flier. Service is readily available.

Criticism: Stick assembly has about one degree of slop. Servo torque somewhat low for the CE-1 units tested. Some nonlinearity in system accuracy (see figure).

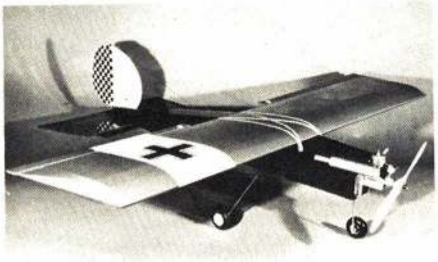
Characteristics: **Dimensions:* Transmitter**—6¼H × 6½W × 2T; **Receiver**—1½W × 2-1/8L × 3/4T; **Servo****—2¼L × 1¾W; **Battery Pack**—1¼ × 1¼ × 2¼; **Total Airborne Weight** (with four CE-1 servos and 500 mah pack)—approximately 13 oz.; **Transmitter Output*****—750 milliwatts; **Receiver Selectivity*****—2 microvolts for full control of decoder; **Receiver Sensitivity*****—6 db down at ±4 kHz from selected frequency; **Servo Output Thrust**—2-1/8 lb. average at 7/32 in. radius; **Servo Torque**—0.46 in.-lb.; **Servo Transit Time**—0.5 sec. end to end.

* All dimensions, inches.
** Servo dimensions include mounting lugs and output wheel height.
*** Manufacturers data.



MIDWEST SWEET STIK

DUANE LUNDAHL



If you have been doing as I have over the past few years, namely, building ever more sophisticated airplanes powered by the latest and most powerful 60 engines, trying out retractable landing gears, and as a result, basically sport flying with a fully competitive pattern ship, let me make a recommendation. Try a *Sweet Stik* and find out what fun flying is all about again.

As with all of the "Stik" models manufactured by various companies, the *Sweet Stik* is far from being a pretty airplane, but in addition to sharing its ugliness, it also shares the fun-to-fly capabilities which have been a mark of this series of airplanes. The *Sweet Stik* is a scale-up of a Midwest *Little Stik* and the recommended engine size is from .19 to .45 cu. in. The model reviewed here used a 40 size engine and is an absolute ball to fly. I would suspect that although the airplane would fly well with a 19, it would not be capable of all of the manuevers one can perform when additional power is available. An interesting aspect of the *Sweet Stik* is that it is impossible (at least for me) to make the airplane spin. The full up elevator and low throttle results in nothing more than an increased sink rate with full rudder and aileron control still available, but you just can't make the thing stall out.

The kit itself is generally of very good quality with a complete hardware package. The wood in my kit was of excellent quality with one exception, that being the main wing spars which are ¼-in. sq. spruce. One of these was warped and I made the mistake of going ahead and using it with the net result that, though the wing was built on a wing jig, it has a slight warp. The plans are excellent and detail the entire building process so that a rank beginner would have no difficulty in building this kit. The die cutting was good. All of the parts kit, but part numbers should be marked on the parts rather than having to go through everything and match it to a drawing on the plans.

The engineering of the fuselage is exceptionally good, with strength built in where it should be. The wing, however, is another matter. As mentioned above, the warped wing spar caused a slight warp in the wing and this is primarily due to the fact that the basic structure allows it to happen. Given straight wood and proper covering techniques, no problems will be encountered with the structure as designed. However, you can certainly be much more sure of a warp-free wing if the leading edge sheeting is carried back to the main wing spar both on the top and the bottom, and if webbing is then added between the upper and lower main spars. This creates a "D" tube which is virtually warp-free and gives a very stiff and strong wing.

In summation, the kit's excellent features far outweigh any negative comments and it is unquestionably a good value. When you get done building the airplane and fly it, the true fun value of this kit will be apparent.

Specifications: Wingspan—54 in.; **Wing Area**—600 in.^{2}; **Length**—45 in.; **Weight** (ready to fly, incl. radio)—4 lb. 11 oz.; **Wing Loading**—14 oz./ft.^{2}; **Rec'd Engine Size**—19-.45 cu. in.

CARL GOLDBERG

"HIGH PERFORMANCE and LOW COST" —an ENGINEERING ACHIEVEMENT

C G RETRACTS

Jim Oddino and Bill Salkowski make the highly-regarded limited production S & O Radios seen on the West Coast. They're top flyers themselves, and do lots of testing. Both use CG Retracts, and here's what a recent letter from Jim said:

Dear Carl: Have to compliment you on your landing gear system, which I think is a rare engineering achievement. Normally the engineering process is one of tradeoffs, and that usually means the greater the desired performance, the higher the cost. You seem to have captured both **high** performance and **low** cost. As far as I am concerned your retracts have no performance deficiencies, are reasonably priced, and something I think is important they are available at most local hobby shops. When someone tops all that, I'll buy their landing gear.

Yours truly,
Jim Oddino

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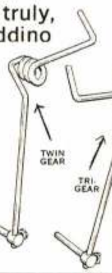
BURBANK

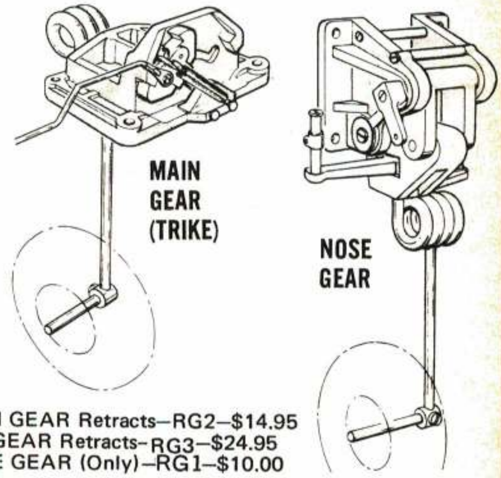
LONG STRUTS & ADJUSTABLE AXLES

Can also be used in older model CG Retracts.

Twin Gear set RS2—$3.00

Tri Gear set RS3—$4.50



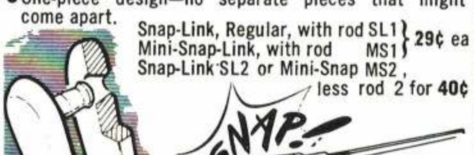


TWIN GEAR Retracts–RG2–$14.95
TRI-GEAR Retracts–RG3–$24.95
NOSE GEAR (Only)–RG1–$10.00

UNIQUE SNAP-LINK! Patent 3711134. Now for the first time—you can buy a truly safe link—the SNAP-Link!

- Tiny 45° shoulder snaps through arm, prevents accidental opening. So unique it's Patented !
- One-piece design—no separate pieces that might come apart.

Snap-Link, Regular, with rod SL1 } **29¢** ea
Mini-Snap-Link, with rod MS1 } **29¢** ea
Snap-Link SL2 or Mini-Snap MS2, less rod 2 for **40¢**



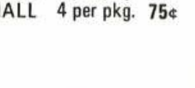
NEW—MAJOR R/C FITTINGS SETS

Here's the economical way to buy the major fittings for your multi-ship. In one set, you get all the horns, links, keepers, bellcranks, or strip aileron linkage, and hinge material—and at a saving.

R/C Fittings Set No. 1 for ship with standard ailerons. RFS1 **$3.50**

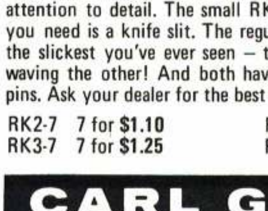
R/C Fittings Set No. 2 for ship with strip ailerons. RFS2 **$3.50**

NEW! KLETT PUSHROD EXIT GUIDES



To protect your fuselage and insure smooth operation of your pushrods. Precision made of tough nylon. Easy installation. Large for 5/64" wire, small for 1/16" wire.

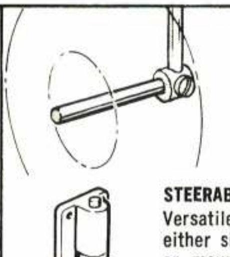
PEG-1 LARGE 4 per pkg. 75¢
PEG-2 SMALL 4 per pkg. 75¢



KLETT HINGES – WORLD'S FINEST!

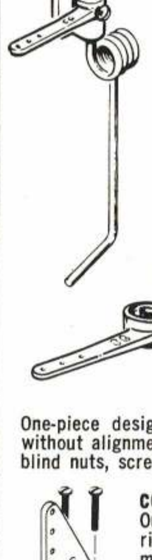
Designed and manufactured by Roy Klett, originator of world-famous RK hinges. An exclusive with Carl Goldberg, these hinges are made with exceptional care and attention to detail. The small RK2 hinges are so thin all you need is a knife slit. The regular size RK3 hinges are the slickest you've ever seen – try holding one leaf and waving the other! And both have **removable music wire** pins. Ask your dealer for the best – Klett hinges.

RK2-7	7 for **$1.10**	RK2-15	15 for **$1.95**
RK3-7	7 for **$1.25**	RK3-15	15 for **$2.35**



5/32" ADJUSTABLE AXLE

Adjustable axle allows you to easily have the strut length you want. Both the axle and screw are hardened steel. Just file a flat on the strut, and tighten axle in place. AA1 **75¢** ea.



STEERABLE NOSE GEAR

Versatile — steering arm can be to either side, or slightly up or down, or mounted on bottom with extra collar in slot. Steering arm is nylon, stiff enough for good control, yet can flex under shock to protect servo. Collar is hardened steel — won't strip like brass. Screw is hardened steel, too. You can really torque it and get good grip on music wire strut without a flat.

Complete steerable nose gear with nylon bearing, 5/32" plated music wire strut, extra collar, blind nuts, screws and washers G16N **$2.50.**

NYLON STEERING ARM

Hardened steel collar and screw SA1 **75¢.**

NYLON BEARING

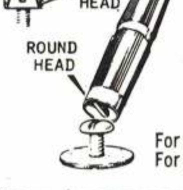
One-piece design mounts to firewall without alignment problems. Includes blind nuts, screws and washers NB1 **75¢.**

CONTROL HORNS

Our new horns have the upright part rising from the center of the base for maximum stability. Holes are right size for 1/16" wire; nut plate for simplest mounting. Long horns CH1 or short horns CH2, with screws—**50¢**/2.

NYLON REINFORCING TAPE

This nylon reinforcing tape is extremely tough when applied with epoxy around the center when joining wing halves. 2½" wide x 5 ft.—N2 **50¢.** ¾" wide x 5 ft. N1 **25¢.**

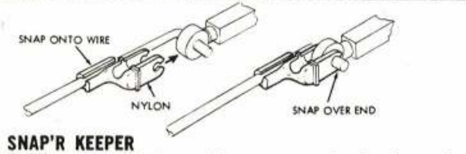


NEW KLETT SAFETY DRIVER SOCKETS DOWN ONTO SCREW HEAD — CAN'T SLIP OFF AND DAMAGE YOUR WING!

Takes Round Head Screws and Binder Head.

KLETT SAFETY DRIVER

For ¼" Nylon Screws SD1 } **98¢** ea
For #10 Nylon Screws SD2 } **98¢** ea

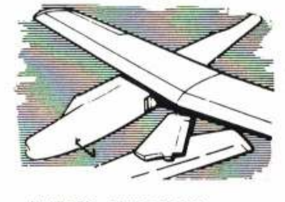


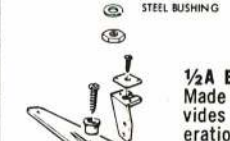
SNAP'R KEEPER

Quickest, handiest way to secure pushrod wire end to servos, horns, etc. Works on wire 3/64 to 5/64" diameter. SK1 **50¢** for 4.

REPLACEMENT FOAM WINGS, ETC.

To go with your own design fuselage. Proven efficient Ranger 42 foam wing gets you in the air quickly — **$3.95.** Stab and vertical fin, set **$1.95.** Assembled Ranger 42 fuselage, plus bearers, nosegear, etc., **$9.95.**



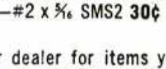


AILERON BELLCRANK

Bellcrank has steel bushing of proper size, so crank can be screwed firmly in place without binding. No electrical noise—all metal parts are screwed tightly together— AB1 **50¢** for 2.

½A BELLCRANK and HORN

Made of nylon, this new set provides smooth ½A control line operation. Easy on dacron lines, too BCH1 **25¢.**



SHEET METAL SCREWS

Like wood screws, but better. Sharp, clean, full-depth threads, hard and strong. Excellent for mounting servos, etc. Includes washers—#2 x 5/16 SMS2 **30¢** for 10; #4 x ⅜ SMS4 **30¢** for 8.

P.S. For best service, see your dealer for items you want. If not available, write direct; add 50¢ per item ($1 outside U.S.). Minimum order $1.

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AL RABE ON CL

Stunt Fuel: Stunt fuel consists primarily of oil, methanol and nitromethane. The oil is for lubrication, just like the mixture that you would use in a two-cycle lawn mower. The methanol is simply wood alcohol (poisonous) which we burn to produce power. Nitromethane, or "nitro" is used to improve the burning characteristics of methanol. When nitro is used with methanol, engine stability is improved, needle valve settings broaden, power and fuel consumption are increased and the high nitro exhaust or raw fuel turns butyrate dope white.

In addition to these basic components, commercial fuels include additives which improve fuel's versatility. These additives include igniters, detergents and sometimes small quantities of special libricants or anti-seizing compounds. Fortunately, for stunt or sport we seem to be able to leave these additives out of our simple mixtures. Our engines start readily without igniters and run cool reducing or eliminating a requirement for varnish-removing detergents or anti-seizing compounds. Since, in competition, I sometimes adjust my oil content below safe percentages to improve duration, I also use an additive. A little Sig Lubricin N-1 (2%) seems to help with rod galling with the really low oil mixtures.

Methanol can be obtained from nearly any chemical supply house. The cost varies from as much as $4.00/gal. in one gal. cans to $1.00 to $1.25/gal. in five gal. cans to 50 cents or less in 55 gal. drums.

For oil, you can use Bakers AA Castor oil (Sig has it), Klotz two-cycle racing motorcycle oil or a Ucon. Each has its advantages and disadvantages but as long as we run four-cycle they all seem to work well. Castor oil is the old standby but engine specialist Clarence Lee seems to favor Klotz. The oils are readily available and run $7.00 to $9.00/gal.

Nitromethane is the tough one to obtain, and this, more than anything, may stop you from mixing your own stunt fuel. If you are fortunate enough to live near a large city, you can probably find it at chemical houses which specialize in dragster or "performance" car fuels. Racing Fuels, Inc. of Dallas is such a company. Nitro costs about $7.00/gal. and, by regulation, is available only in five-gal. quantities. It can be shipped by truck but that would probably cost more than the nitro.

To mix a good serviceable stunt fuel, you will need some nitro. 5/ is enough. More than 10% is hard on paint jobs with little, if any, improvement in performance. Sleeve bearing engines need at least 22 to 25% oil Ball bearing stunt engines can usually get by on slightly less. I've tried as little as 15% oil which ran alright if I didn't ruin the rod on the first cold start of the day. The rest of the fuel is methanol. A good, reliable mixture would consist of 5% nitro, 25% oil, and 70% methanol. If you are running a ball bearing engine or need a little extra duration, you might try 5% nitro, 20% oil, 2% Lubricin and 73% methanol.

I mix the normal fuel by putting one gallon of nitro and five gallons of oil into a six-gallon plastic mixing jug and shake until thoroughly mixed. I store this "concentrate" and mix fuel as required in one gallon cans by putting 35 to 40 oz. of concentrate into the can and filling it the rest of the way with methanol. Shake well and go flying.

I mix the lower oil fuel by using one gallon of nitro, four gallons of oil, and two quarts of Lubricin to make my concentrate and use about 35 oz. of concentrate per gallon of fuel.

Why bother? Well, first, depending upon what you pay for methanol, your fuel will probably be a little cheaper. Figure anywhere from about $2.75 a gal. (methanol in 55s) to about $3.50 a gal. (methanol in 5s). Second, you competition types can adjust the length of your run very precisely by varying the relative concentrate/methanol percentages. Using more concentrate and less methanol will shorten your run. Using less concentrate and more methanol will lengthen your run (and just possibly ruin a rod if you overdo it). Third, by mixing your own fuel, you may be as finicky as you like about measurements and may easily produce fuel more consistent in operation from gallon to gallon than commerical fuel. Finally, you might consider carrying concentrate only to big, long contests like the Nats and find methanol locally to increase your gallon of concentrate to about four gallons of fuel.

If you don't care to mix fuels, why not try Fox Superfuel for all breaking in. Afterwards, you might want to switch to Sig Champion CL Stunt fuel for slightly longer duration and lower fuel cost. I haven't tried it, but for ball bearing engines, the formula for Sig's Peter Chinn RC Special looks good and is also inexpensive. If you use commercial fuels only and have duration problems from too small a tank, try using a little non-leaded gasoline (about six oz. per gal.) in your commercial fuel for a few extra laps without changing much the character of your run. It works, of course, by diluting your fuel which reduces the relative oil content by one or two percent. Like any other low oil mixture, you must balance risk, heat and wear against competition necessity.

DON LOWE ON RC

Downwind Turns: Most of you have been warned of or have experienced difficulty as a result of downwind turns at low airspeeds and altitude. There is a lot of misconception about what is taking place. J. Spratt, writing in the March issue of the Rapid City, South Dakota newsletter, "Propbusters," explains the whole phenomenon pretty well. He writes: "There is a prevalent fallacy regarding the reasons for the hazard of downwind turns close to the ground. This results from the belief that the airspeed of the aircraft is affected by the wind. Such is not the case. Once the aircraft is free of the ground, only its speed relative to the air has any bearing on its remaining in flight. Velocity and direction of the wind do affect the path of the aircraft over the ground, but that is all. . . ." He continues: "In taxiing, the velocity and direction of the wind has a very definite effect on the airplane and the effectiveness of the controls, because the airplane is still in contact with the ground.

"During downwind turns close to the ground, it is noticed that when the airplane is approximately crosswind, it seems to hang momentarily without speed and, as the turn is completed to the downwind course, the airplane seems to pick up speed with a rush. Both of these impressions result from watching the ground even though the pilot is not directing his attention to it. The speed of the airplane relative to the ground is the only speed affected. The airspeed stays the same. If the plane is flown properly, the airspeed will be normal during the turn."

He concludes by saying: "It is true that downwind turns close to the ground are hazardous, particularly immediately after takeoff. The reasons for this include the following.

"Any turn, in any direction, is hazardous too close to the ground, but a downwind turn presents the additional hazard of placing the pilot in the poorest position from which to make a landing in case of power failure.

"There is a variation between the wind velocity just above the ground and at altitude due to the friction of the earth and the objects on it. This will give the plane an additional rolling moment or overbanking tendency, when one wing is near the ground and the other up in the air, as in a steep bank close to the ground. . . .

"Due to the two impressions mentioned previously, after completing the turn the pilot may be misled to believe that his airspeed has increased during the turn. This misapprehension could lead to a serious stall at a very low altitude."

I might add an additional caution: When flying in any significant wind condition and particularly when it's gusty keep your airspeed a little higher than normal. This is to accommodate the varying wind velocity and prevent a possible stall, particularly on the landing approach if you suddenly hit a momentary decreased wind. It's best to carry additional power on the approach in such conditions and not flare on landing as you would normally do on a calm day.

Aerobatics: Stunt or aerobatic flight is the process of maneuvering the aircraft in one or more planes to perform predetermined patterns of aerodynamic flight. "Predetermined" is a key word since it infers that the maneuver is intentional and not strictly luck. Most sport fliers, whether they admit it or not, fly aerobatic patterns that are usually spontaneous but nevertheless stunt or aerobatic maneuvers. A new flier can usually hardly wait until he has the courage or know-how to perform his first loop or roll, and then nothing can stop him—he will hardly fly straight and level thereafter except possibly for takeoffs and landings.

I can remember many years ago, immediately after soloing a Stearman trainer, that most solo flying sessions were spiced with illegal loops, rolls, inverted flight, etc. There simply seems to be something aesthetic about maneuvering an aircraft in three dimensions that satisfies the soul. To me there is nothing more beautiful than watching a precision aerobatic performance of a Pitts bipe or other high-performance aerobatic ship—it's poetry in motion.

The average Sunday flier is a stunt or aerobatic flier whether he admits it or not. His average aircraft is built from a kit of a competition aerobatic airplane or is a reasonable facsimile thereof.

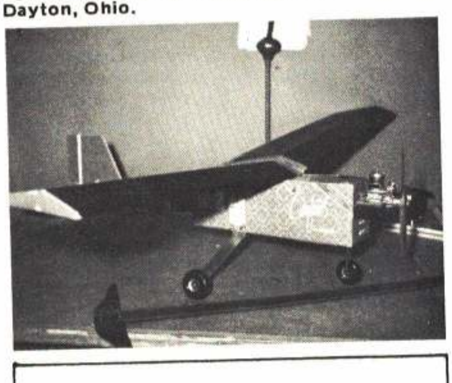
There are some, of course, who prefer the slow, stately flight of a glider, but even there aerobatics creeps in.

Some guys like to do nothing but shoot landings. My old friend Jack Port loved shooting touch and goes with his old "Smog Hog" (remember that one?), but every now and then he would rip off a loop or roll or two and then back to landings.

There is a challenge in stunt or aerobatic flight that is a bit different from other categories of modeling—an attempt to extract total capability from the machine, limited only by available aerodynamic performance of the aircraft and, of course, pilot ability. Once the trainer or limited performance aircraft is mastered, then it is on to faster, more maneuverable, more demanding challenges.

Even helicopter fliers are thinking about aerobatic flying and some are even attempting it. I hear from Dewey Broberg (Du-Bro) that they have looped their new O & R-powered machine and there are others that perform nice wingovers. (How about a roll with a helicopter?) I've been dreaming of performing aerobatics with a RPV (Remotely Piloted Vehicle) equipped with TV. We plan to do just that eventually in our military RPV project. We have done rolls and it's a kick! Can't you just imagine a future aerobatic competition in which the maneuvers are flown via TV? No reason why this can't happen if we could just get TV cameras down in weight, size and price. We have flown a nine-oz. TV camera in our project "Teleplane," but the little jewel is worth over $10,000! So it's possible to make the ingredients small enough—all we have to do is make them cheap enough! So, here's to the stunt or aerobatic flier—he ranges in capability and desire from the Sunday sport flier doing his thing with sometimes recognizable maneuvers, to the polished Class D expert competition flier who is satisfied with nothing short of top-level competition—something for everybody!

Confidentially—this aircraft(?) cost $3.02 exclusive of wheels, engine and radio. Uses obvious materials—mostly cardboard—does it fly? Tune in next month, by A. Scwartz of Dayton, Ohio.



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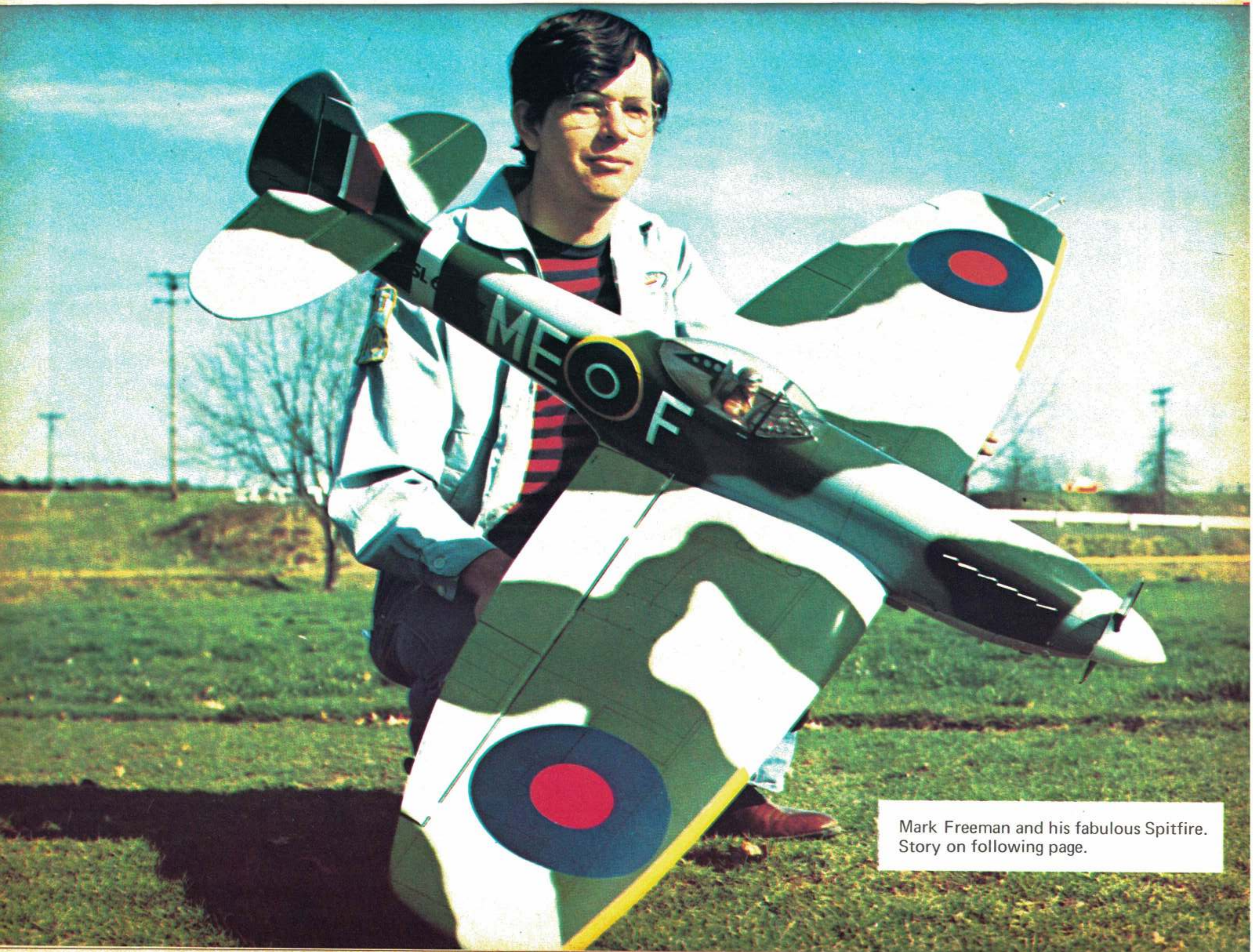
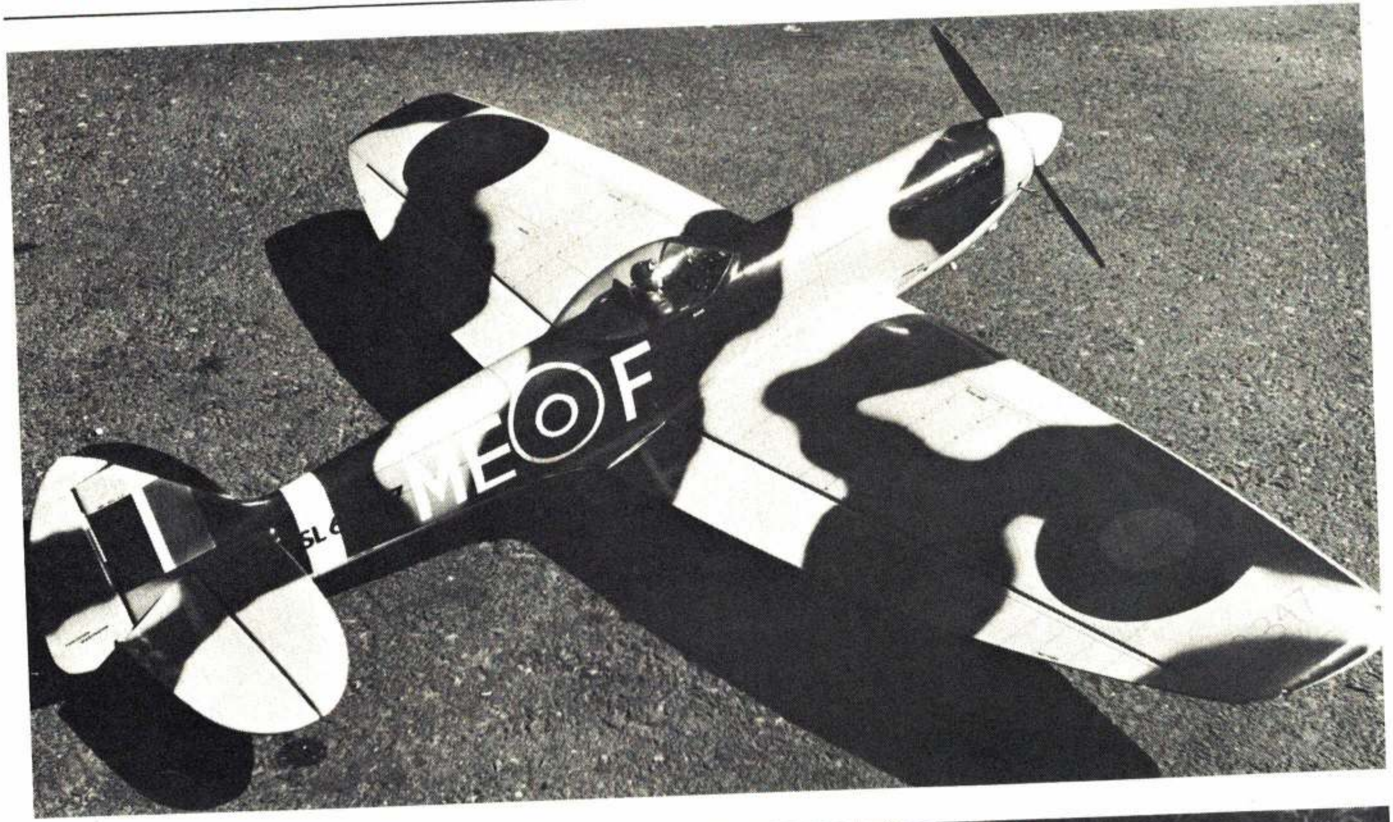
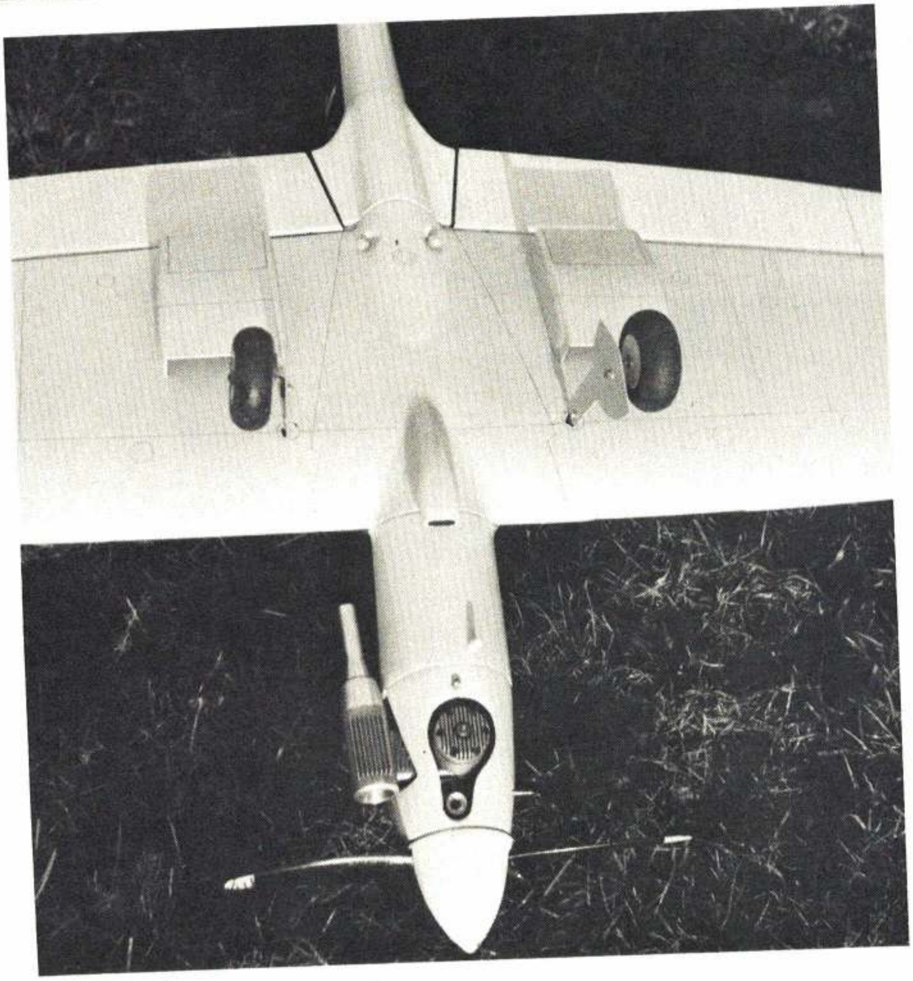


Mark Freeman and his fabulous Spitfire.
Story on following page.

SPITFIRE MK.XVI





Above: This late model Spit was the best all-altitude British fighter of WWII. One subtle way to gain maximum appearance points is with a well-detailed cockpit, but keep it light, as shown above. Right: It is a two-piece airplane, for easy internal adjustment and transport. Wing radiators are open in back—minimum drag.

This late model British fighter, in stunt form, is a contest goer and winner. Features all the latest proven design ideas. / by Mark Freeman

I have persisted in building model aircraft since the age of five, now 17 years later I wonder if I'll ever grow out of them. Evidently not, no more than a gull would sell his wings and buy one of the noxious tin shell automobiles we regard so highly in our American Dream culture. Designing, building and flying my own aircraft is a means of creative expression which gives me much satisfaction. This kind of satisfaction is getting harder to come by in today's society where little is hand crafted and the emphasis is on buying and owning, not creating.

It is satisfying to create a thing of beauty and indeed model airplanes assume some beautiful forms. This beauty enters another dimension when the model flies, for flight in itself is a beautiful thing.

The combination of beauty in form and beauty in function is what makes building and flying model aircraft an art. Art implies creativity and it is this aspect of creativity that makes modeling a rewarding experience for me.

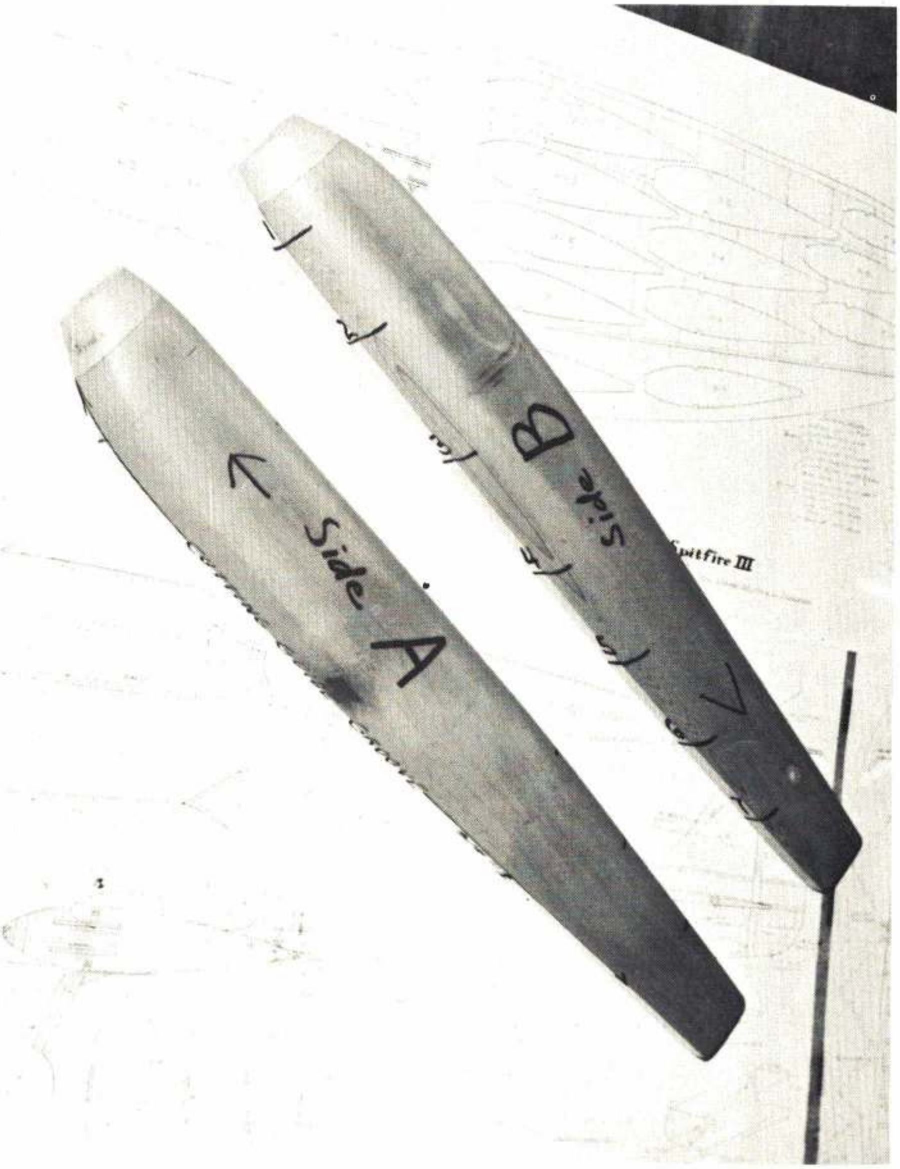
Why the Spitfire? Two years ago I came across an unfamiliar plane in an aviation magazine. It was obviously a Spitfire by the elliptical wings and long tail moment, but instead of having a razorback fuselage and malcomb hood, it sported a full teardrop canopy like a P-51D and a much broader elliptical shaped fin as opposed to the blunt rounded fin.

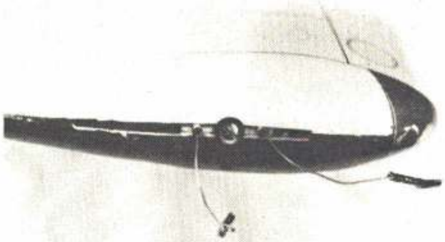
It was a Spitfire Mk. XVI, a late production Spitfire made toward the end of WWII. This late production Spitfire had to be one of the most beautiful planes of its time.

Having built Al Rabe's Mustang (June 1969 **AAM**) and applying his ideas to a FW 190 of my design, I felt the Spitfire would be an excellent superscale stunter. It would have to be done right, however. This meant a tail moment arm three in. longer than I had ever used before and a low wing with dihedral.

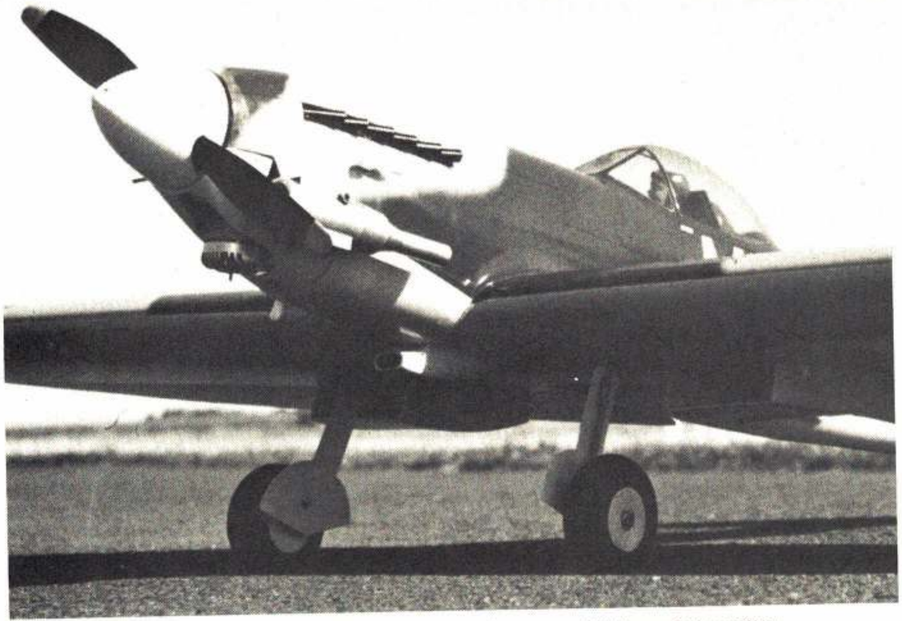
My first Spitfire was a clumsy effort. It was too big with a wingspan of 62 in. and too heavy at 4½ lb. My Supertigre 46 had to run nearly wide open to fly the pattern with it. Squares had to be flown very wide because of the high wing loading and small flaps. I flew it in one contest and didn't place—a poor performer but impressive looking in the air.

Although disappointed in the performance of the ship, I felt I was going in the right direction and wanted to redesign it. Al Rabe gave me some suggestions, one of which was to go to the clipped wing version. This would give greater wing area for a given span as opposed to elliptical wing tips. I decided to use Al's new improved Bearcat III airfoil, much, much larger flaps, a removable wing, variable ratio flaps and elevator, and a radial engine mount, in

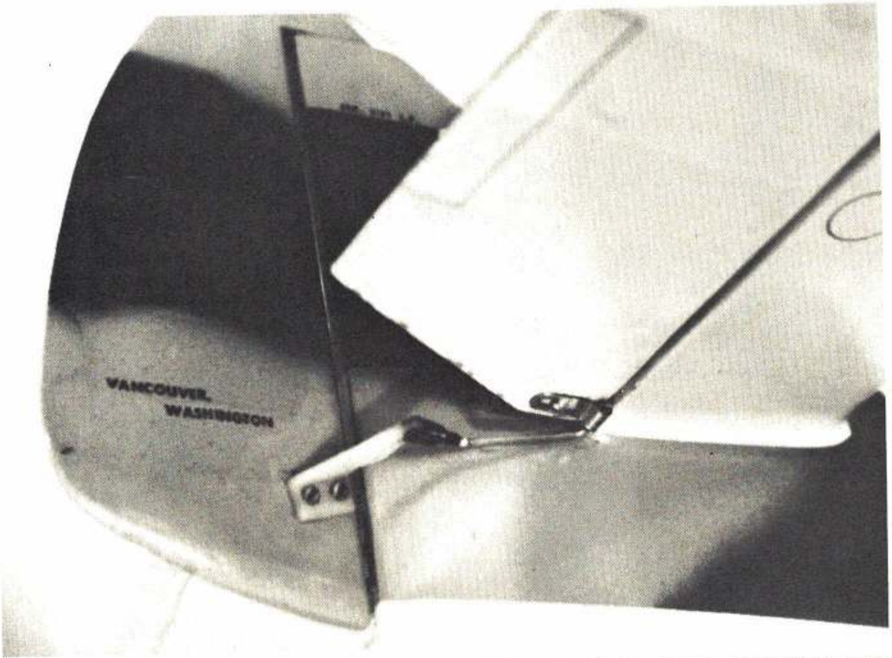




Above: Fuselage halves are made using Dale Root's methods from the June 1969 AAM (back issue available). It is easier than it looks. Left: Leadouts exit through a fitting that adjusts fore and aft to optimize line tension to suit conditions.

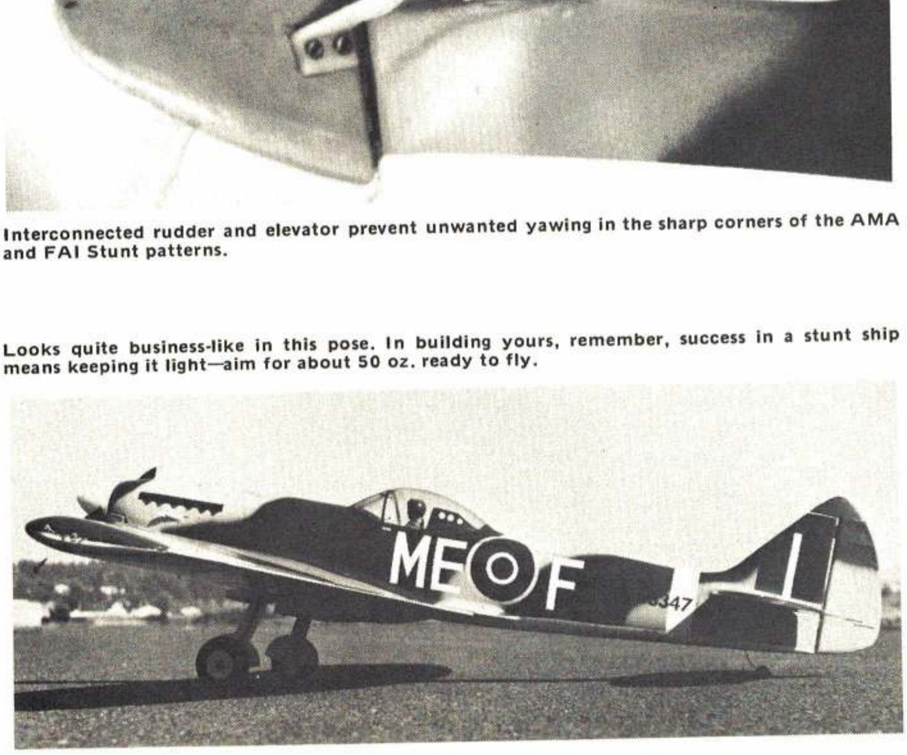


Neat engine installation gives the S.T. 46 good cooling even with the quiet muffler.



Interconnected rudder and elevator prevent unwanted yawing in the sharp corners of the AMA and FAI Stunt patterns.

Looks quite business-like in this pose. In building yours, remember, success in a stunt ship means keeping it light—aim for about 50 oz. ready to fly.



addition to the adjustable leadouts and movable adjustable rudder featured on the first ship. Also added later was a removable outboard wing tip to adjust tip weight, and an adjustable length pushrod. The overall size was reduced to a 57-in. wingspan, this being a more reasonable size for stunt.

Al suggested a molded balsa fuselage to save weight. This seemed formidable at first, but it was easier to do than I had anticipated. The result was beautiful—two perfectly formed fuselage half shells each weighing 1½ oz. Once these were made, all I had to do was add the fuselage bulkheads, glue the two sides together and the greater part of the fuselage was done.

The Spitfire II's only handicap is eight oz. of excess weight. With the design refinements made in the Spitfire III plans, plus the table of weights furnished (based on the original component weights) and the right wood, a 50-oz. Spitfire should be possible. This is my goal for my next one and should be yours if you build one.

I use mufflers on all of my Stunt ships. It is a lot easier to concentrate on the pattern if I don't have that sharp, piercing engine noise distracting me. A muffler-equipped, quiet engine enhances the pattern, making it more appealing to the judges and spectators alike.

Let's face it, engine noise is very irritating and harmful to the ears. It is a great drawback to model aviation, but need not be. Especially today, when there are many mufflers on the market and more coming. I would like to see mufflers mandatory for all Control Line and Radio Control events. It would not only make our flying more favorable in the eyes and the ears of the public, but also less of a health hazard to the individual modeler.

For the sake of your ears and your friends, use a muffler.

Spitfire II came out absolutely beautifully. Admittedly, the weight was more than desired—58 oz. instead of 50—but the plane has proven itself an excellent performer in spite of this.

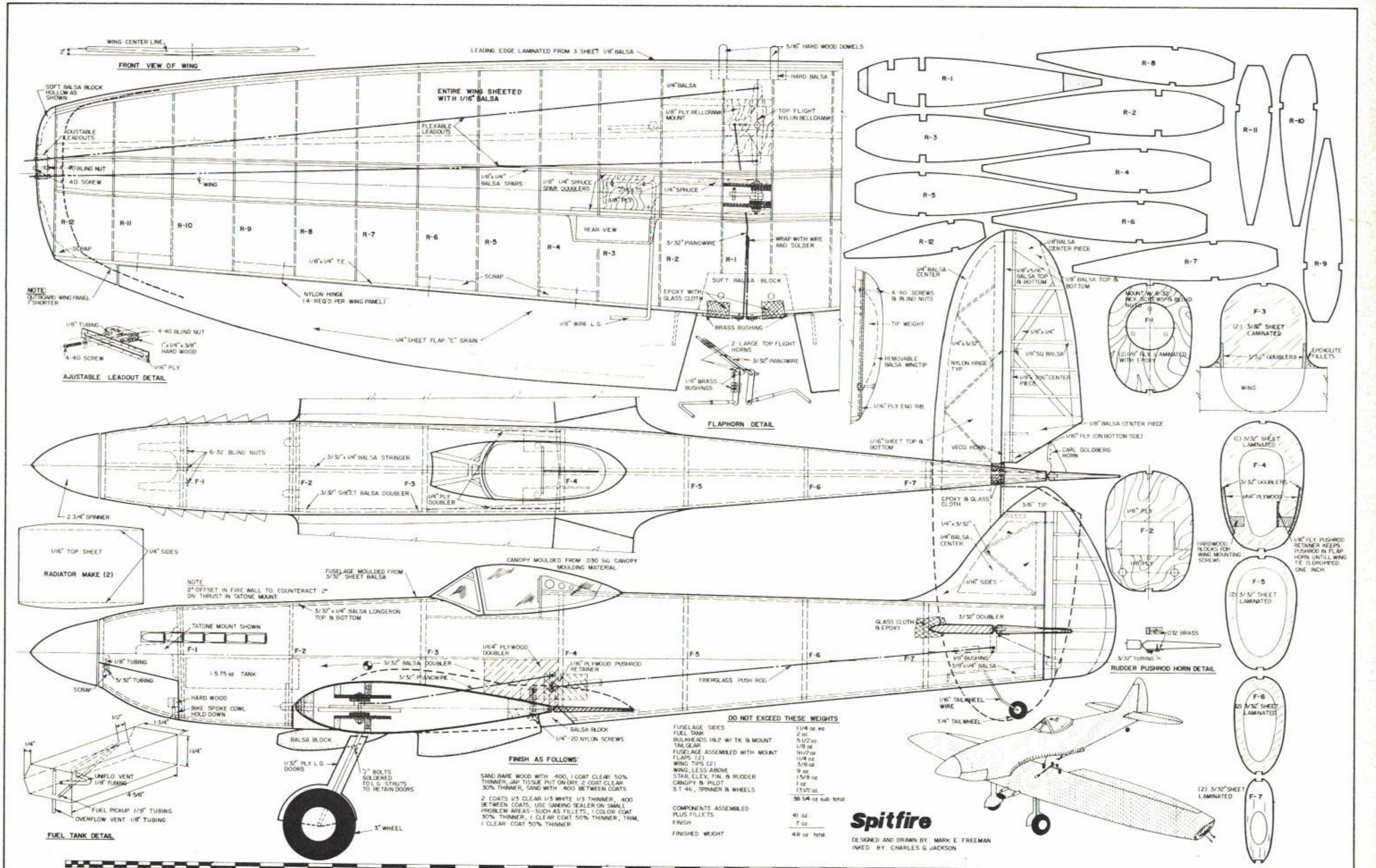
Its first test was at Kent, Washington for the 1971 Boeing Management Contest. Here the Spitfire rewarded me with a first in Open Stunt, getting the season off to a good start.

The Spokane Internats was the next contest of the year and the largest for the Northwest. On Saturday of this meet, eliminations were flown to select the top five contestants for fly-off on Sunday. Everything seemed to fall into place and I felt like I couldn't do anything wrong; as a result, the Spitfire was on top of the scoring for that day.

On Sunday, my luck wasn't with me. The wind had picked up overnight and flying was a bit more touchy. On my first official, my engine run was short and I didn't get to the cloverleaf. I adjusted the needle valve a bit leaner for my second official flight. After the overhead eight, however, the engine began to sputter—it was still running, but erratic. Should I attempt the cloverleaf? The wind was 15 to 20 knots now, and I decided not to risk losing the plane.

(Continued on page 75)

FULL-SIZE PLANS AVAILABLE–SEE PAGE 84



DO NOT EXCEED THESE WEIGHTS

FUSELAGE SIDES	1 1/4 oz. ea.
FUEL TANK	2 oz.
BULKHEADS 1&2 W/ TK & MOUNT	5 1/2 oz.
TAILGEAR	1/8 oz.
FUSELAGE ASSEMBLED WITH MOUNT	9 1/2 oz.
FLAPS (2)	1 1/4 oz.
WING TIPS (2)	3/8 oz.
WING, LESS ABOVE	9 oz.
STAB, ELEV, FIN, & RUDDER	1 5/8 oz.
CANOPY & PILOT	1 oz.
S.T. 46, SPINNER & WHEELS	13 1/2 oz.
	38 3/4 oz. sub-total
COMPONENTS ASSEMBLED PLUS FILLETS	41 oz.
FINISH	7 oz.
FINISHED WEIGHT	48 oz. total

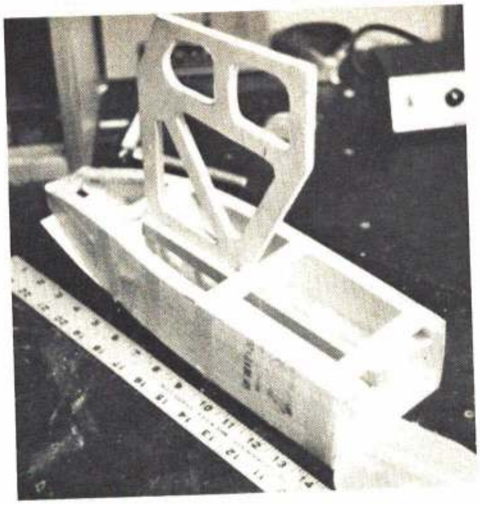
FINISH AS FOLLOWS:

SAND BARE WOOD WITH 400, 1 COAT CLEAR 50% THINNER, JAP TISSUE PUT ON DRY, 2 COAT CLEAR 30% THINNER, SAND WITH 400 BETWEEN COATS

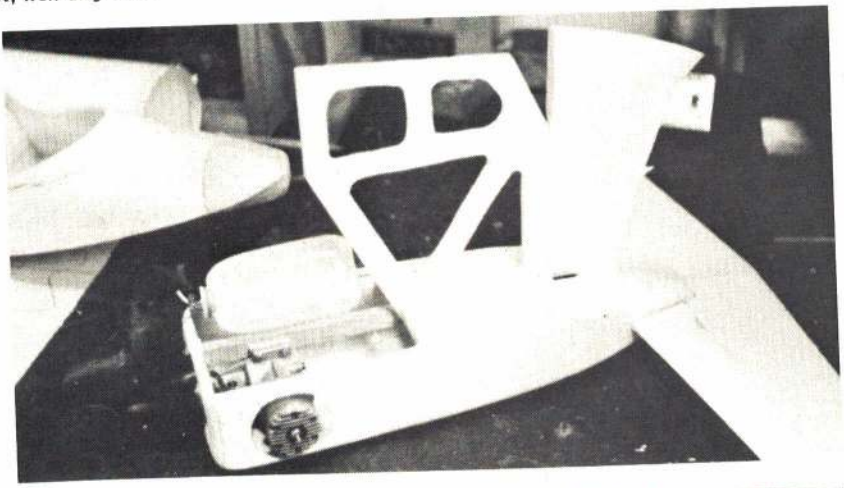
2 COATS 1/3 CLEAR 1/3 WHITE 1/3 THINNER, 400 BETWEEN COATS, USE SANDING SEALER ON SMALL PROBLEM AREAS - SUCH AS FILLETS, 1 COLOR COAT 30% THINNER, 1 CLEAR COAT 50% THINNER, TRIM, 1 CLEAR COAT 50% THINNER

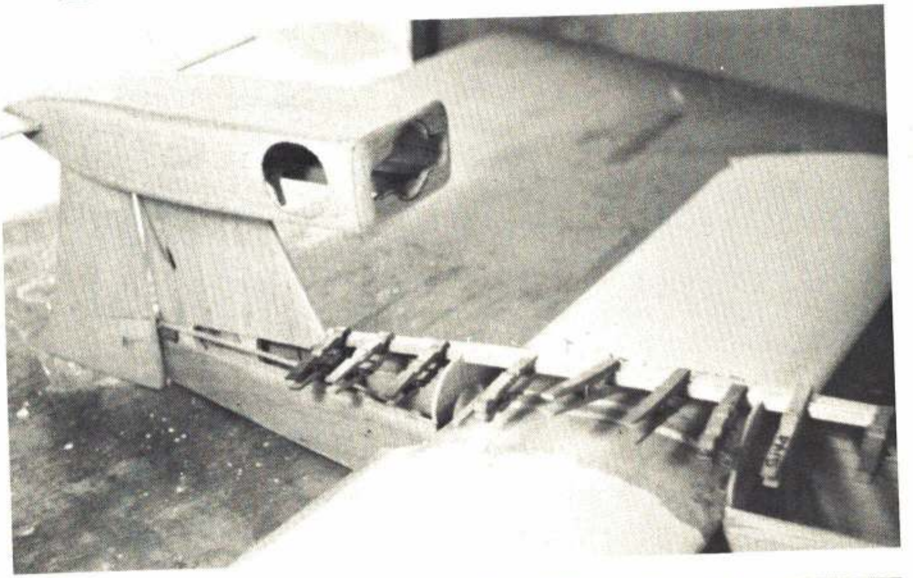
Spitfire

DESIGNED AND DRAWN BY MARK E. FREEMAN
INKED BY CHARLES G. JACKSON

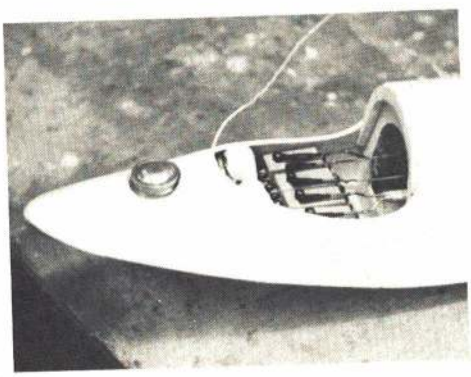


Right: First part of construction is completion of engine/rudder/elevator unit. Quarter inch plywood is the backbone here. Below: Finished pylon less control rods. Access hatch is on bottom side of the unit, well disguised.





Above: Wing and pylon must be finished before starting the fuselage—it all ties together and is a one-piece model. Right: All four servos are up here. Lots of linkages going everywhere. Cap up front is author's way to waterproof switch and charging jack installation, and also to seal antenna exit.



SPECTRA

(Continued from page 38)

Now for the moment of truth (all on film, of course). It seemed a little hard to lift off; it skipped and was in the air, almost straight up. At about 25 ft. I touched down elevator and she snapped over the top and went straight down. Now full up elevator—she just cleared the water and was headed vertically. Again at about 25 ft. I touched down. She started down, and this time the bank of the pond slowed the descent to a stop. The fuselage was a wipe-out but all else looked pretty good.

After some soul searching, I decided to try again. With five-minute epoxy a new fuselage was built fast—not pretty, but fast: *Spectra No. 1½*. My engineer friends picked up the rebuilt seaplane, checked it all over, and decided it needed lots of downthrust. So we put in downthrust and went back to the pond. It still taxied beautifully, but on takeoff at about six to ten ft. altitude, it did almost an outside loop and hit the drink. This time we added more lead to the nose and reduced the elevator throw. It did the same thing. It was beginning to get to me. I have built and flown a lot of unusual stuff and am considered a competent test pilot at our field, but this thing—wow!

I had done everything right, checked the CG and the thrust, even made an incidence change, but to no avail. I added tip plates to the stab, cut off the elevator, and added more lead to the nose. Then, on the fourth weekend of attempts, it flew. I set the plane down, stood back and looked at it and muttered a few unkind things to it. I again checked the CG and noted it was an inch and a half ahead of design. I put in the fuel and just for kicks checked the CG again. Yikes! The CG was right on the mark. A few more well-chosen words for the plane before I advanced the throttle. Would you believe a takeoff as pretty as a picture and three whole minutes of flight when the engine quit—why now, when I was alone?! She landed very nicely with nary a bounce.

So that was it. When you add fuel you change the CG. In a conventional plane, the addition of fuel makes the plane more nose-heavy, no problem. But with the tank in the rear—well, that's it! When I added fuel the CG moved almost an inch and a half back. So on a nine-in. cord, that was like 12%, or from 33% to about 45%—sort of snappy.

With that problem solved it became a real nice plane to fly. To date I have about 30 flights on two different *Spectras* and I can say without fear of contradiction that any *Spectra* will do all the stunts you can think of—clean and straight.

Construction

The plane is constructed with standard sizes of wood as in the engine pylon. The ¼" ply looks strange because it uses a standard 6 x 12" piece. The pod and flying stab are built as a unit. Glue the engine bearers to the 1/4" ply frame. Attach formers and sides, then lay in triangle to form corners. Now build the stab. The elevator horn and hinge assem-

(Continued on page 73)

SIXTY-FIRST IN A SERIES

getting started in R/C

HOW VARIOUS PARTS OF RC SYSTEM ARE ADJUSTED

JIM McNERNEY

One of the areas we are frequently asked about is the adjustment of radio systems. This month's discussion will be about the secondary controls in an RC system which are normally adjusted only at the factory or by a qualified technician.

Unless you are thoroughly familiar with the system and have detailed procedures available to you, *leave the adjustment alone.* The following comments are not designed to teach you how to adjust your radio. They are merely presented so that you can better understand its function.

Some of the adjustments which are available on RC systems include: (a) servo centering and throw; (b) encoder pulse spacing and travel; (c) receiver tuning; (d) transmitter tuning.

Servo Centering: The center position of the output arm or racks is normally adjusted by adjusting the neutral position of the feedback potentiometer wiper. In most of the newer servos this is done by rotation of the potentiometer shaft, using a screwdriver or hex key. On older servos the potentiometer element must be loosened and rotated. Extreme care must be used in making this adjustment. Use of the wrong tool can cause damage to the shaft or wiper. Allowing the servo to travel too far during adjustment can result in stalling the servo and eventual failure of an output transistor or integrated circuit. Servo throw and centering are also affected by the transmitted pulse neutral spacing and travel. If you use a servo made by one manufacturer with a transmitter made by another, it may be necessary to recenter the servo. If you plug the same servo into different outputs and get different neutral positions from the various outputs, assuming all sticks and trim tabs are centered, the problem is a misaligned encoder in the transmitter.

Encoder pulse spacing and travel: This adjustment is best made using an oscilloscope with a calibrated time base. If the encoder is properly set up, any servo purchased from the same manufacturer can be used without further adjustment. An alternate method recommended by some kit manufacturers is to pick one servo as a "standard." By plugging it into successive outputs and adjusting the corresponding encoder controls to center the servo, the encoder can be aligned. Then all the other servos are adjusted as discussed earlier. The stick potentiometer wiper position determines the pulse spacing or "centering." A separate trim potentiometer inside the transmitter controls the travel. These two adjustments affect each other so that both must be rechecked repeatedly until the desired throw and centering are attained.

Receiver Tuning: Leave this to the experts. There are several steps involved in the tuning process. Receivers in metal cases must normally be tuned in the case. For accurate tuning, an oscilloscope and a VTVM or TVOM are required as well as the proper tuning wands. Metallic tuning tools are a no-no. Scope leads should contain RF chokes to prevent loading and allow a pure demodulator signal to be displayed. The transmitter signal must be attenuated sufficiently to observe the "peaking" of each tuning adjustment.

Transmitter Tuning: This is only permitted for persons holding a second class or higher commercial radio operator's license or, in the case of six meter only, an amateur Technician, General or higher class license.

Another adjustment can be made on some units and procedures are provided by the manufacturers. This is an adjustment for control stick friction or tension.

Footnote—Since our article on trainer aircraft, many manufacturers have come out with new trainer kits. Check the ads in this issue and also the RC **Products Directory**. Many can be powered with engines from 19 to 45 and can be safely operated with rudder, elevator and throttle controls only. With costs of everything skyrocketing, the smaller or medium-sized aircraft become much more attractive. Initial cost is lower and the smaller engines don't gulp fuel quite so fast.

Some time ago we discussed the type of airplane best suited to someone just getting started in RC. We gave a lot of reasons to build a relatively simple, mild-mannered airplane. Thanks to a recent newsletter from the Cedar Rapids Sky Hawks we can give you another one. An eight-in. pattern bird doing 90 mph represents 4331 ft./lb. of energy. A 30/06 rifle bullet at 100 yd. has 4000 ft./lb. of energy. You don't let a novice wave a 30/06 around out at the field. Think about it.

FRED MARKS ON RC

Bits and Pieces: From the N.A.R. Flightmasters: Before punching or pressing out die-cut parts from balsa wood sheets included in any kit, take a sanding block and sand the back side. This will enable you to remove the parts more easily with less chance of breaking. (Use felt tip marker to identify parts of kits that aren't stamped. F.M.)

If you have trouble finding a suitable clamp for small intricate parts, try the Imperial hair clip (medium size). It is small, light and of soft enough material to be bent for different applications, and is ideal for holding vertical webs to spars, planking to leading edges, etc. Available in drug stores these clips sell at about 10 for $1.00, but are much cheaper if bought by the pound in beauty supply houses (about $1.00/lb., which is about 100 clips).

From the *Valley Forge Signal Seekers:* Tuning Your Receiver by Sound.

"This is for those who do not know much about electronics and are having trouble with glitches and poor range on their radio systems and are ready to try something different to clear up tie receiver tuning problems. It has often been said that the best way to tune your radio would be right in the plane, the way you fly it. This has not been practical, so we do the next best thing and send it back to the factory. Well, it can be successfully tuned in the plane with no fancy equipment and it can be done quickly with very little experience. All it takes is an earphone like the one on your transistor radio and a small tuning tool which can be purchased for less than a dollar or even made from a piece of plastic just so it will turn a tuning slug or an IF can.

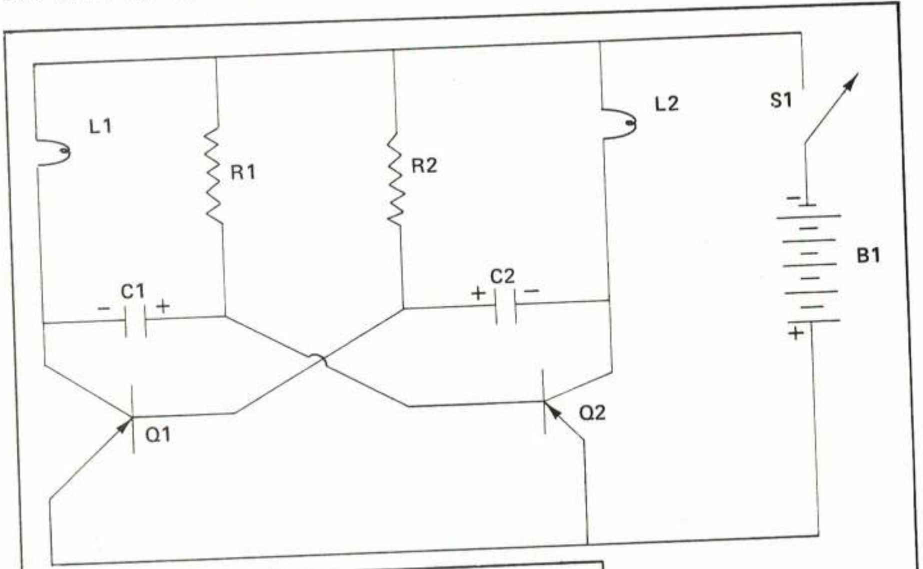
"The whole idea is simply to make that servo move when the transmitter says "move" and the servo wants the maximum signal from the receiver to do just that. The method is to connect the earphone to the receiver where the servo is normally connected (a spare plug and some clip leads will do) and listen to the pulses and tune until maximum range is attained. This has been tried on three different brands of radios and the results have been very satisfactory.

"This is the way it goes, with the system installed in the plane and the wing removed, take the cover off the receiver and expose the electronics. Then unplug any servo and insert a spare plug with exposed terminals or wire ends. Next turn on the transmitter and place it on the ground with the antenna collapsed or removed. Then clip earphone to the terminals of the spare plug and listen for the pulses. On my EK, I connected the earphone to the red and yellow wires (+ battery and signal leads). On four-wire systems the red wire is (+), the black is (-), and the center tap is white. Try the earphone across the black (-) and the fourth wire, whatever color your set uses. The pulses will be heard as a clear buzzing sound.

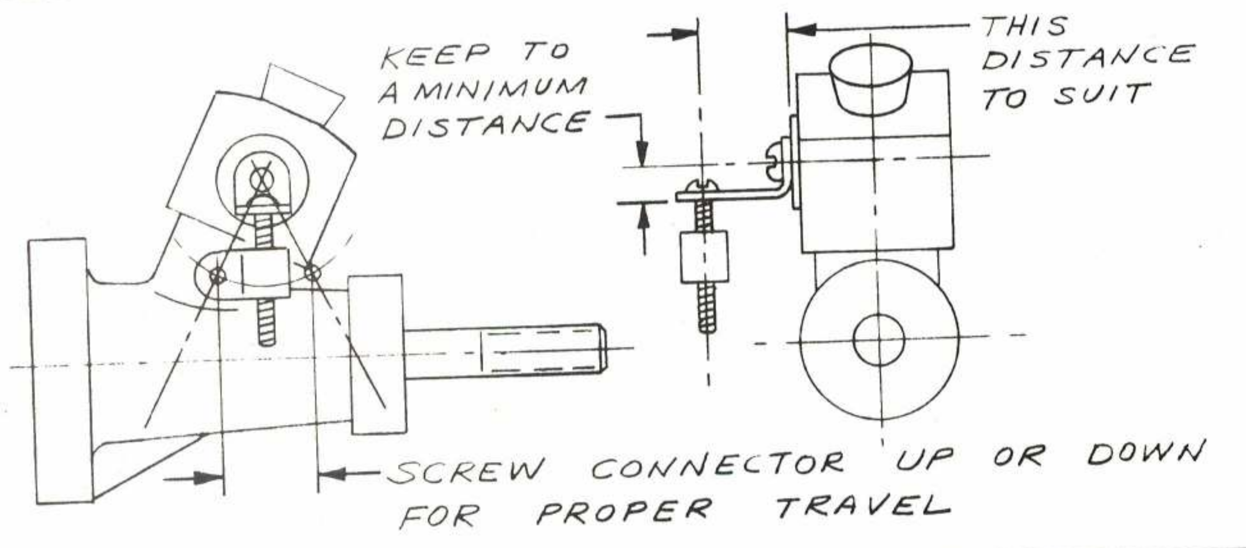
"If you have any doubts about the earphone connection on your system, connect a voltmeter across the receiver battery pack and watch the voltage. If it drops over one volt, disconnect the earphone and try again—you were on the wrong leads. Once you hear the buzz, with the earphone in your ear, tuning tool in hand and plane under your arm, start walking away from the transmitter. As you move away the buzz will eventually diminish and stop. Stop walking and back up a step or two or shift around until the pulses are again heard. The idea is to be at the extreme end of the range. With the tuning tool, begin tuning for maximum sound in the earphone. Start with the two RF coils and then go to the IF cans. (That's everything you see.) Repeat the process several times and then move further away and continue this until no further improvement can be made. As you get near the end, there is only a small tuning range in each adjustment where the tuning is good. At this point, you are finished. Disconnect the earphone and put the cover back on the receiver and check the range again. If you didn't make an improvement, it didn't need a tuning to start with. I think you will be surprised, particularly when you go out and fly down in those low areas where you were in the habit of getting glitched or if you have one of those systems that gives you heart failure if you accidentally point the transmitter antenna at the plane."

F.M.—If you try the preceding, we suggest that 10 to 12 microhenry chokes be used in the leads from the receiver to the earphones. After performing such tuning, recheck the range with the earphones removed to ensure that detuning hasn't occurred. However, it is still best to have the receiver tuned by a qualified, well-equipped repair service. (Incidentally, the Signal Seekers have an excellent newsletter.)

A Light Blinker For Wingtip Lights: This is the circuit for a light blinker for wingtip lights from Mike Donovan. When S1 is turned on, L1 stays on for about 1/2 sec. then goes out and simultaneously L2 comes on for 1/2 sec. If you prefer to have two lights blink at the same time, replace L1 with a 15 ohm, 1/4 watt resistor and parallel two bulbs to the L2 output. Build the circuit on a small piece of perfboard or 1/16" plywood.



B1-6V (4 "AA" cells)
C1, C2 - 50 uf, 15v
L1, L2 - No. 49 bulbs
R1, R2 - 22,000 ohm, ¼ watt
Q1, Q2 - CK722, Hep 253, SK 3004, GE2, or equal
S1 - SPST slide switch


KEEP TO A MINIMUM DISTANCE
THIS DISTANCE TO SUIT
SCREW CONNECTOR UP OR DOWN FOR PROPER TRAVEL

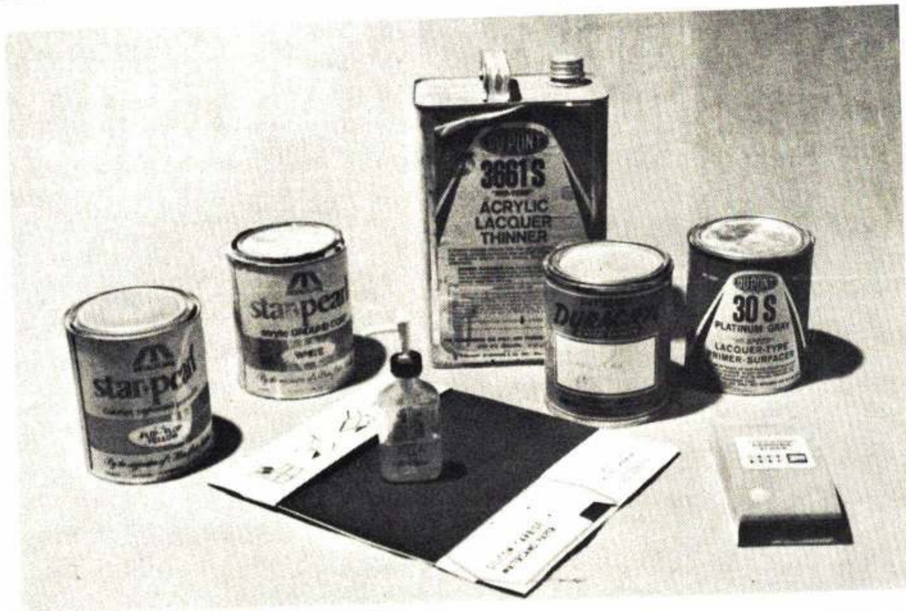
Throttle valve adjuster link by Bob Mayhew of Taylor, Michigan.

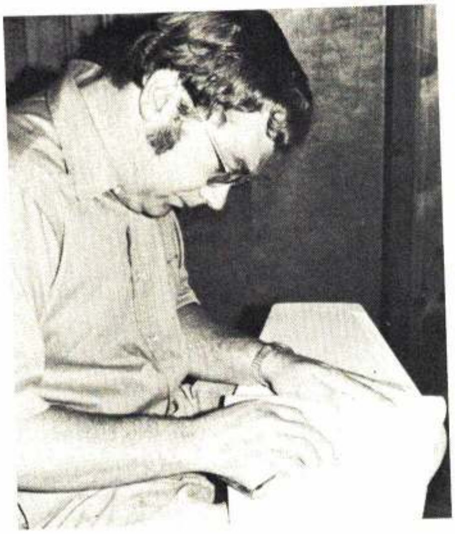
PEARL FINISH

The 'How-to-do-it' of this striking finish is on the following page.

PEARL FINISH

How to get a finish with deep luster and translucent sparkles. / by Bob Brown





Top: The paints for pearling are available from several auto paint manufacturers. Right: Wet sand the entire surface carefully. This process produces the "ultimate" finish. Below: Lettering and numbers are masked with a hand-cut stencil. An airbrush is used to fog the background shadows. Bottom: Apply the pearl paint evenly with an overlapping spray pattern.

"What type of paint is it?" "How do you do it?" These questions and many more pertaining to the pearl paint on my airplane were asked of me at the Toledo and WRAM shows. This article will explain my techniques and the materials used.

An award-winning paint scheme begins when the first pieces of the airplane are put together. The gaps between the joints must be at a minimum, and an attempt should be made to eliminate as much filler as possible. When you begin to sand the aircraft, use at least a 4/40 grit of aluminum oxide paper. Final preparation of the airframe requires sanding with a grit of 320 wet/dry paper used dry.

After sanding, brush one coat of Hobbypoxy Quick Prep Resin on the tops of the wing and stab. When dry, apply the resin to the bottom of the wing. This procedure prevents runs or sags and saves considerable time. Allow the resin to dry naturally. Heat applied to aid in curing time frequently creates warps and brittleness.

When the resin has dried, sand with 4/40 sandpaper or 220 wet/dry paper. The entire surface must be sanded and wiped clean with acetone. Fill any dings or dents with a paste of micro balloons and Quick Prep Resin. As these dry, sand smooth.

A bright flood lamp will highlight all the blemishes when the object is held at the proper angle with the light. This lamp will later prove valuable while painting.

After all the blemishes have been filled, apply a second coat of resin. Sand with 320 wet/dry paper when dry. Do not use finer paper as the paint will not adhere correctly. After sanding, wipe the air frame down first with acetone and then with a tack rag.

All the paints used should have plasticiser added. After the surfaces have been prepared, dust a light coat of grey acrylic primer over the surfaces. Sand this with 400 wet/dry and remove most of the primer to eliminate weight. If a second coat is needed to obtain a smooth surface, apply and sand where necessary. Use a tack rag to clean the dust from the surface.

Next, apply a coat of white acrylic lacquer with plasticiser added. When dry, sand with 400 wet paper to remove all blemishes. A second coat of white lacquer will probably be needed to cover all the surfaces. Make sure the entire surface is pure white. Any color variance cannot be corrected after this step.

Mix the pearl paint so as to suspend the pearl-like material within the acrylic. Apply the paint so that the spray pattern of fan overlaps to achieve a smooth pearl effect. The same flood lamp used earlier now enables the painter to see his overlapping of fanning spray pattern. After the paint has dried, lightly sand any blemishes with 600 wet/dry paper. Two or three coats of pearl will be needed to develop the desired effect.

After the pearl has dried, apply two coats of clear acrylic lacquer to create depth. Sand the surfaces wet with 600 wet/dry paper and then rub with polishing compound. Do not rub into the pearl. Apply a final coat of clear Hobbypoxy to prevent fuel damage.

Properly followed, this process adds little additional weight and produces a finish impossible to describe.

For further information pertaining to pearlescent paint, write to Metalflake Inc., Haverhill, Mass. 01830.

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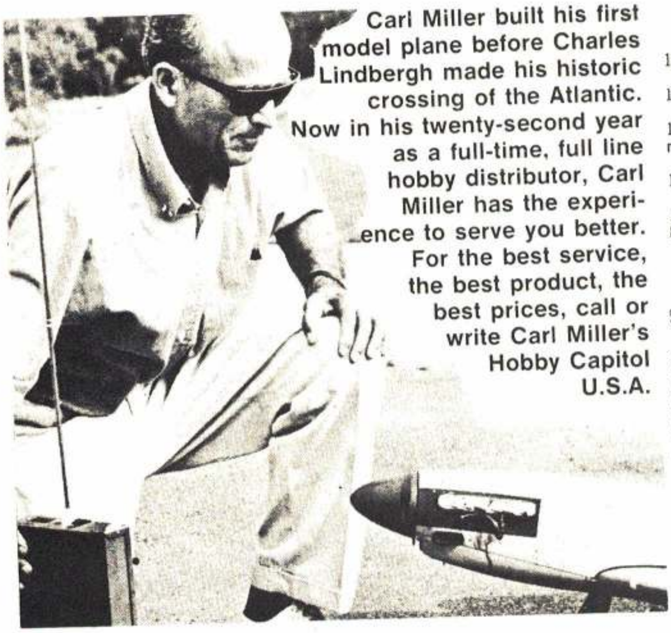

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SPECIFICATIONS

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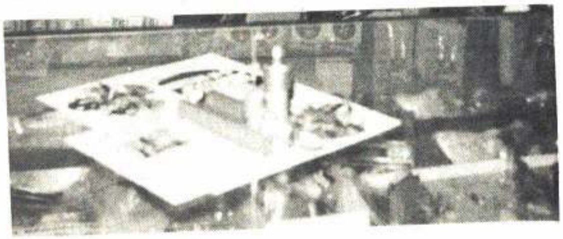

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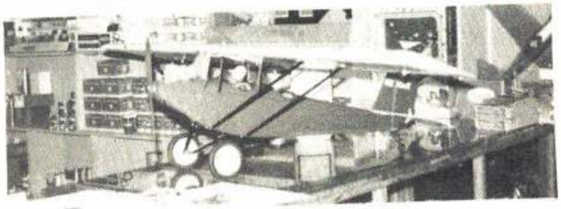

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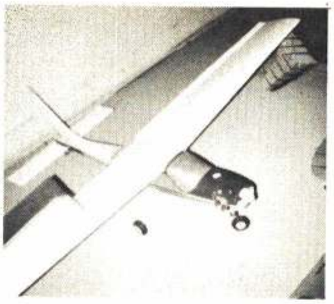
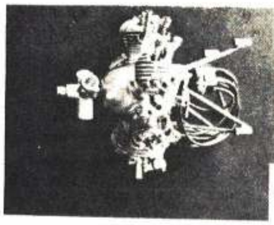


Graupner Scale Cessna 177 Cardinal with OS 30RC - NEW Installed, Rods and Scale Wheels-$175.00 Deluxe

Gypsy Moth Bipe- mts. for ST 40RC-about 60"-Wing Silked-Cream & Red-$250.00



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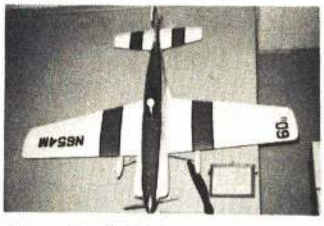

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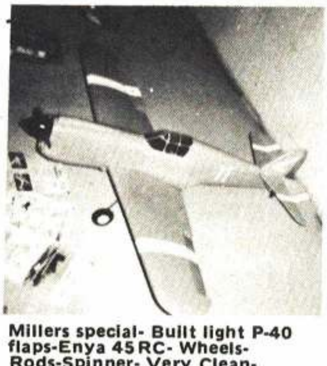

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2- Bonner 4 ch 2 Stick, 4 RS-small receiver & servos on 72MC, clean, like new **$160.00**

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4- Blue Max 6 ch 2 stick, small S-4 servos-$150.00 with 6 servos--very clean **$175.00**

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8- OS Digital 4 ch stick, can't tell from new, original wrapping **$150.00**

9- Orbit Cobra 3 ch for cars, has wheel, full nicads--3 servos--complete **$125.00**

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11-C'Aire 3 ch, Bonner stick,--complete--3 servos--all for **$75.00**

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13-Kraft 2 stick transmitter by itself--series 71 on 27.195MC **$25.00**

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212-Stormer Delux-Silked & Checkerboard paint design - clean **$125.00**

213-Contender **$85.00**

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217-DH Gypsey Moth 60 in., 2 seater with pilot, for ST 40RC, light cream and red, silked **$300.00**

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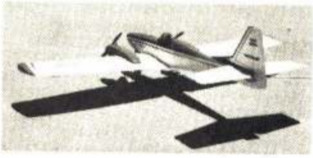

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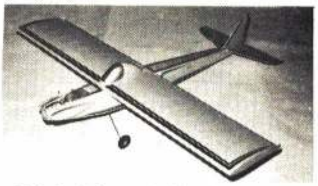
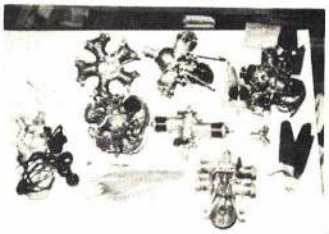


Original formula I pylon racer for 40RC- beautiful high gloss finish-silked-$100.00



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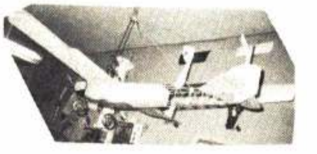

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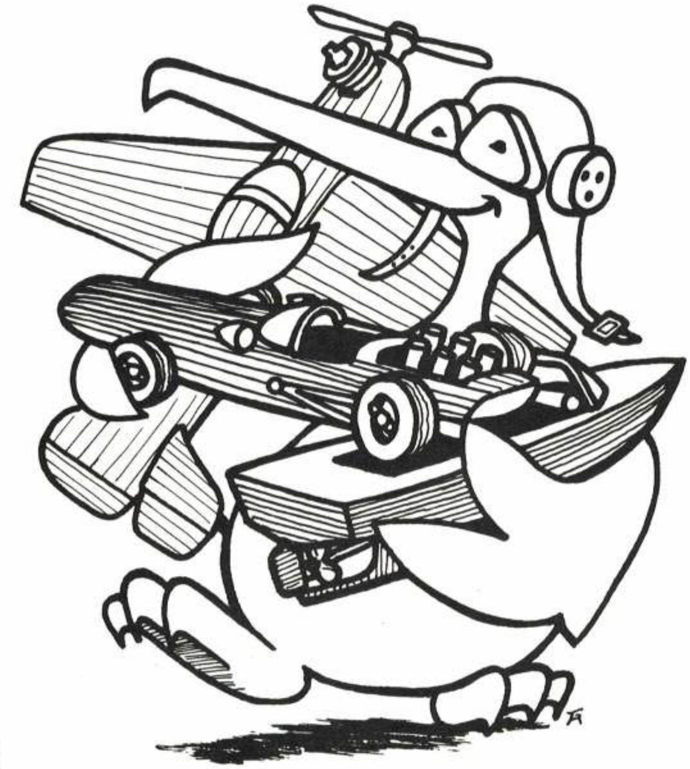

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SPECTRA

(Continued from page 64)

Author peers through cockpit window to locate a leak—was a structural failure since prevented by fiberglassing. Three bladed prop necessary with larger engine.

of epoxy here as this is the only attach point for the stab. The rudder is hacked out of light ¼" balsa.

The fuselage sides and formers are cut. ¼" square is glued to bottom edge of fuselage side, formers are glued in, and the whole mess is held together with masking tape. At this point, only glue in former F1 at the ¼" square points, as the rolling of the balsa around the nose will take some time and patience. When sides and formers are dry, soak the balsa side between F1 and F2. Allow to soak under dripping towels 15 to 20 min. Apply a generous amount of glue to former F1 and gently roll the sides together. Be prepared to trim down the centerline as the roll progresses. Hold in place with lots of masking tape. When dry (damp wood and glue), put on the keel and sheet the bot- bly is epoxied to stab and the bearings are epoxied to the engine pod. Use lots tom. The front should be hard, strong balsa and the back light and strong.

Install the engine pod and stab assembly and put in control linkages for stab and engine. Assuming you have finished the wing while all else was drying, make and attach the aileron pushrods. Be sure all control rods reach into the cockpit area because once the top is on you can't get in there again. Glue in the

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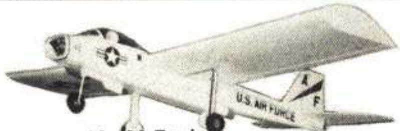

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wing and now heavily dope or Hobbypoxy the inside. Use lots of either remembering this is a SEA plane. Soft 1/16 or 3/32 is used for top sheeting.

The nose block can be put on any time now but the simulated nose boom of 1/4" brass tube is to be filled with lead after the radio is installed and the tank filled with fuel to get the proper balance. Fiberglass the bottom back to the step.

The switch and charge plug screw cap fitting on the nose may not be aesthetically pleasing, but it sure is functional. It keeps the water out!

The windshield is clear acetate and may be sprayed on the inside with one of the transparent candy color plastic paints. I put a piece of heavy celastic around the inside edge of the cockpit to seat the sheet metal screws that hold the windshield on.

I suggest finishing with Hobbypoxy as I believe it's the best waterproofer.

Flying

The flying of the *Spectra* should present no problem if you balance her full of fuel at or ahead of the point shown. Be sure your stab is at zero, drive her around the water a few minutes and point her into the wind and apply the power. Ease back on the elevator and she will just rise out of the water. On the landing, get down close to the water and ease the elevator in for stall landing.

If you like seaplanes, I am sure you can't resist this one. It flies beautifully and looks great in the air.

ON THE SCENE

(Continued from page 14)

testants as well as the spectators. After having driven many miles to fly in a contest and then be limited to one flight per day, it was a welcome change indeed to be able to fly five rounds on the first day and four on the second.

After the fly-offs on Sunday, the first three finishers in Class C Expert had a fly-off for the Grand Champion Trophy.

In Class C Expert, Joe Bridi, the sage of Harbor City, flying his new *Super Kaos* for the first time, showed that he is the master at his home field. He took the lead in the first round and never looked back. Joe never blows a maneuver. Every one is right in the groove. It is really a pleasure to watch him fly. After that performance, I'm sure he will have alot of orders for the *Super Kaos*. Joe won the Grand Champion trophy, also. One wonders where he is going to store all that hardware.

Jack Strickland won C Novice and Bill Simpson moved into C Novice with his win in Class B. Dennis Breene also moved up into Class B with his Class A win. Dennis really had his Webra howling in his new *Super Cuda*. His loops appeared to go through 20,000 ft. in the top end. Those big maneuvers really please the judges!

National Pylon Champion Bob Smith gave an aerial display during Saturday's halftime that was something to behold. His low inverted pass the length of the runway with a couple inches to spare brought a roar from the crowd. Bob finished second in the qualifying rounds and then fifth in the fly-offs after having engine trouble in Class C Expert. Joe Stream put on an aerial rocket display during Sunday's halftime.

The *Super Cuda* seemed to be the most popular aircraft in attendance and Veco and Webra engines predominated. Former National Pylon Champion Terry Prather had a Supertigre Blue Head that was really screaming through the maneuvers. Terry flew in Class C Novice and finished fourth.

There were no crashes of any consequence and no frequency problems. The BIRD Club did their usual fine job of putting on a really great presentation.

SPITFIRE

(Continued from page 48)

This put me out of the running for that contest.

At the next two contests that summer I earned a second place trophy at each meet, one at Eugene, Oregon and the other in Vancouver, British Columbia. These victories, although they may seem small on a national scale, proved that the Spitfire is a competitive machine. Let me qualify this by adding that the competition was sharp and that the planes being flown were of superb quality of craftsmanship, most being in the 40- to 50-oz. range. The Spitfire's performance certainly exceeds my ability to place it properly in maneuvers. I say this because I have only flown Stunt for four seasons. Although I'm not a beginner, I feel I have a lot of practice to do and a lot to learn.

Construction

In constructing the Spitfire I must stress the importance of selecting the lightest wood. All balsa should be four to six-lb. in density. Also, you must use immaculate building practices. Use glue sparingly and fit components accurately. Neatness makes for sturdier construction and *lightness*.

The fuselage was molded from 3/32" balsa sheet on two wood forms. These are cut and shaped from two pieces of soft pine or redwood each measuring 2 x 6 x 39". The two blocks are keyed together along the top view centerline of the fuselage with two 3/8" dowels (make sure the sides mating each other are flat and uniform). After the two sides are keyed together, trace the top view of the fuselage onto the blocks using the seam between the two as a centerline, then cut to shape using a bandsaw. Take the two halves apart, pull out the dowel keys, draw the fuselage side view on each half and cut these out. Key the two halves together with the dowels and commence shaping with a wood plane. This whole process only took me six hours. After the molds are carved, sand them smooth and waterproof them with three coats of dope.

Take out the dowel keys and trace each profile onto a 3/4 x 6 x 39" piece of plywood. Cut out to the profile shape and fasten to each half with wood

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John Maloney

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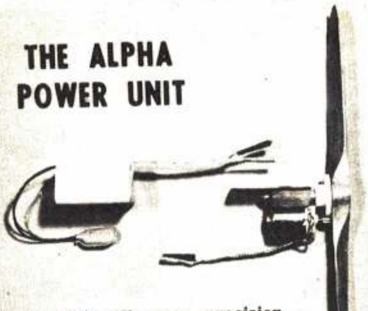

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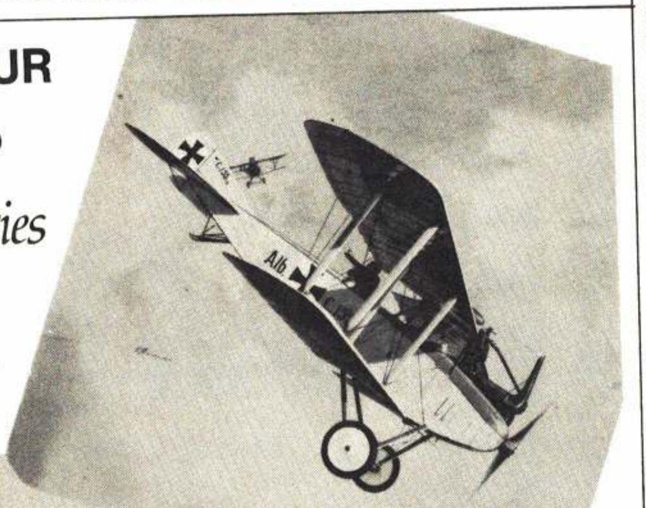

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screws. This gives greater depth to the mold which allows an excess balsa skirt to be trimmed off along the groove between the wood half and the plywood later making an accurately cut-out shell.

Soak 3/32 x 8 x 39" balsa in hot water approximately 30 min. Next, place the balsa sheet on one of the forms and, starting at the center, wrap with surgical gauze from the center to each end. You probably won't be able to get the balsa near the nose at the cowl location to fit down perfectly since this is a tight bend. If this is the case, just trim this part away and mold the cowling separately later. Repeat the process for the other side and allow about two days drying time before cutting the gauze and removing the shells from each mold. You will then have two perfectly formed fuselage shells each weighing 1¼ to 1½ oz.

Next, locate the fuselage former position on the molds and bend strips of solder around the form to establish the proper shape for each bulkhead in your fuselage. Draw the centerline on the inside of each fuselage shell and mark the bulkhead position on these centerlines. Also mark the position of the centerline on each bulkhead so that they may be positioned accurately. Now glue the bulkheads into one of the sides adding top and bottom longerons to give good joining at the seams. Also install the fuel tank and vents at this point. Be sure the engine mount bulkhead is drilled for the type of mount to be used and that 6-32 blind nuts are epoxied into place. Now glue the other shell in position and add the 3/32" balsa and the 1/64" plywood doublers to the inside of the fuselage. For additional details on forming your own fuselage, refer to June 1969 AAM.

The wing leading and trailing edge sheets act as a jig for proper construction and alignment. After cutting out the ribs from C grain balsa, take four sheets of 1/8 x 3 x 29" balsa and trim if necessary so both sides are straight and parallel. They must rest perfectly flat on edge over the plans. Draw the wing centerline on each sheet as shown on the plans. This puts the proper dihedral angle in the wing. Line 0-0 is the edge of the sheets that rest upon the flat surface the wing is built upon. The trailing edge sheets are the same as the leading edge. Note that the inboard wing is one in. longer than the outboard. Draw a centerline through each rib. Prop up the leading and trailing edge sheets with blocks and pin directly over their respective places on the plans. Now pin and glue the ribs into place using the centerline for proper alignment.

Cut the 1/4 x 1/8" spruce spar doubler to size and glue to the 1/4 x 1/8" balsa top spar. Now glue the top spar into place and also the 1/4" balsa bellcrank support. Sheet the entire top of the wing with 1/16" sheet (four to six lb. density) balsa. After this dries, turn the entire wing over and pin down flat again. Glue in the 1/4" spruce bellcrank support. Add the 3/32" pushrod and leadout wires to the bellcrank and glue the bellcrank unit into place. Add the bottom spar then the leading and trailing edge balsa blocks.

Mount the landing gear struts to 1/8" plywood with "J" bolts and glue these into place. Add the scrap pieces of balsa indicated on the plans and sheet the entire bottom.

After this dries, trim down the leading and trailing edge to their proper size and add two more laminations of 1/8" balsa to the leading edge to obtain proper thickness there.

Carve the wing tips and hollow as shown. Make up the adjustable leadout guide, attach to the inboard wing tip and glue on the wing tip. Cut the 1/16" plywood doubler for the outboard wing tip. Epoxy 4-40 blind nuts into place on the inside of the doubler, then glue the doubler into place. Locate the holes in the wing tip for the screws and add brass eyelets to these holes for the screws to bear upon.

Cut the flaps out of 1/4" light C grain balsa. Obtain two large Top Flite RC type horns and cut off half of each. Then solder 1/8" brass bushings into place as shown. Glue the flaphorns to the flaps and install the flaps to the wing with nylon hinges and epoxy. Add the 5/16" hardwood dowels to the wing leading edge and drill 1/4" holes in the location shown for the nylon wing screws. Using these holes to guide you, epoxy the threaded hardwood blocks into place in the fuselage.

Build the tail components with your lightest balsa making sure not to exceed 1-3/8 oz. for the stab and elevator and 1/4 oz. for the fin and rudder. Remember 1/2 oz. of excess weight here means 1½ oz. of extra nose weight. Install the tail group and the fiberglass pushrod. Add Epoxilite fillets. Place a piece of sandwich wrap between the wing and fuselage and bolt the wing into place. Now add Epoxilite fillets and let cure. Unbolt the wing, peel off the plastic and you have a perfectly matched wing to fuselage fillet.

The canopy was formed over a balsa mold of the required shape. Do not finish the mold with anything, sand it smooth with No. 400 then mount it to a block so that it is upright. Tack 030 Sig canopy material to two sticks and heat over the stove until it is very pliable. Quickly drape it over the mold and let cool. Trim to shape and mount to the fuselage with epoxy and Epoxilite.

All surfaces should be sanded with No. 400. Any nicks, scratches or gaps should be filled with plastic balsa. It is very important to have the wood finished as smoothly as possible before any airplane paint (dope?) is applied. The better the wood surface, the less paint required to obtain a smooth finish, which means less weight. After the first coat of dope is sanded, apply Jap tissue to all surfaces. Put it on dry over sheeted surfaces this way it lays over the wood grain requiring less dope to fill it. Sand any overlaps in the tissue smooth and then finish as outlined on the plans. Remember, sand carefully and keep it light. For detailing ink lines, etc., refer to Dave Gierkes article "Gild the Lily" (June 1970 AAM).

The Spitfire should have approximately 36 degrees of elevator travel for a maximum of 30 degrees flap travel.

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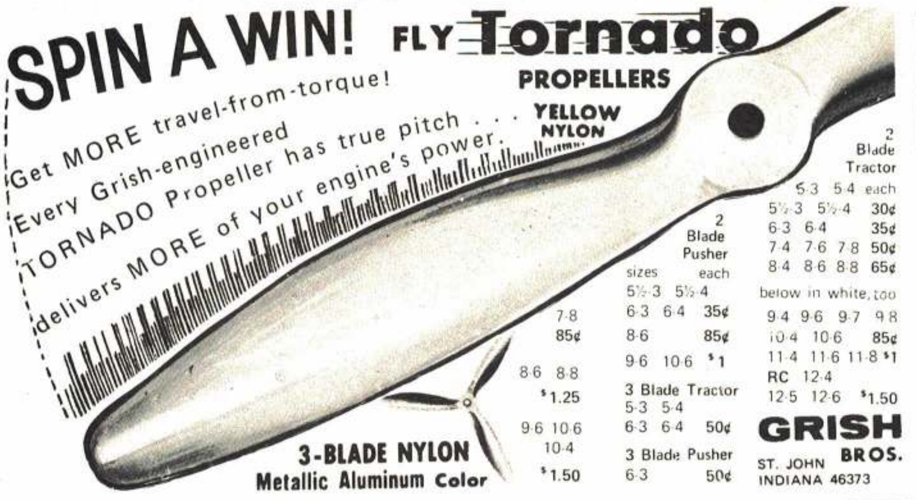
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In conclusion I recommend reading Al Rabe's articles on his Mustang (June 1969 AAM), Bearcat (March 1970 AAM), and also his Mustunt (February 1973 AAM). I'd like to thank Al for his help with the Spitfire. I would also like to thank the many modelers in the Northwest who have helped me and for helping to make flying models the sport it is.

If you have any questions regarding the Spitfire write me, Mark Freeman, 7205 N.E. 43rd Ave., Vancouver, Wash. 98661.

FAI TANDEM

(Continued from page 31)

ably successful in predicting the known performance of a wide range of model types, from Pennyplane to D stick microfilm jobs. The method gives a fairly accurate picture of how design features such as wing loading, aspect ratio, tail moment arm, CG location, amount of bracing wire, length of wing posts, and propeller size affect a model's potential performance.

And that's how the idea for the tandem design evolved. Our theoretical calculations indicated that a considerable reduction in drag could be achieved if the required lift of the model could be shared between two lifting surfaces with some vertical separation between them, rather than being concentrated in a single surface. With the conventional layout, the tail can provide only about

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10% of the total lift, and thus 90% of the weight of the plane must be supported by a single surface. A biplane design with conventional tail surfaces is one way of getting around this, but none of the biplane designs we know of uses a large enough vertical separation between the wings to take full advantage of the concept. The separation should be at least 1/4 of the wingspan; 1/3 span would be better. It's a tough problem to build a biplane with enough wing area and long enough wing posts to be advantageous and still keep the weight down to one gram.

The tandem configuration is a compromise solution to this problem. An ideal solution would be to have both wings produce equal lift. But the requirements of stability do not allow the CG to be located far enough aft to equally load both wings of a tandem. About the best that can be done with a practical tandem tractor design (equal areas front and rear) is to get about 65% of the lift from the front wing and about 35% from the rear wing. The tandem presented in this article was designed along these lines, and the theory indicates that if it can be developed to its full potential, it should have a slight edge over conventional designs. One encouraging note is that our Pennyplane tandems have flown over 13 min. on several occasions.

Using a rubber loop 1/3 the normal length with a carefully weighted wire spacer replacing the other 2/3 of the motor, the FAI tandem has flown the equivalent of 36 min. under an equivalent ceiling height of 160 ft. This version hasn't yet had a full flight with a full motor, so we don't know exactly what it will do. There's probably still some work to be done before the design reaches its full potential.

Construction

Specific details of each part of the construction of this model require the development of special indoor building skills. The indoor series by Tom Vallee (January and February 1971 AAM) describes microfilm pouring and covering.

Materials for the construction of this model were obtained from Micro-X, (5200 Seven Pines Dr., Lorain, Ohio 44053) and Ron Plotzke (36695 Ledgestone, Mt. Clemens, Mich. 48043). Lew

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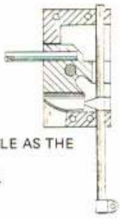

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Gitlow's Micro-dyne also supplied some of the motor stick wood.

Wing construction is begun by selecting a piece of C grain balsa, six lb. density, .036" thick. Lay the sheet out on a piece of straight pine board and using an 18" long steel straightedge, strip off eight pieces .032" wide. Four pieces will be used for the forward wing and four for the aft wing. These spars are scarf spliced in pairs, each pair being used for a wing half.

After the splices have dried, the area along the splice six in. to either side of it is sanded to a taper so that the splice cross section after sanding is .036 x .024". The four sets of spliced, tapered spars are now soaked in warm water for five min., then wrapped 200 degrees around a four in. dia. paper carton (Sig rubber container) and taped in place to dry. Be sure to wrap symmetrically along the splice area so that the finished spars have the splice at the wing tip.

While the spars are drying, an inside cardboard (poster board) form is cut out to the planform of the aft wing. A crescent is then removed from the left panel with a razor blade. The crescent is 5/8" wide at the center. Save the crescent, since it is removed for building the forward wing frame, and put into the right wing panel form for building the aft wing frame. In this manner, the rib spacing layout remains constant for the forward and aft wing, while the wings are asymmetrical about the centerline. The forward wing (V dihedral) and aft wing (straight) also have the same span.

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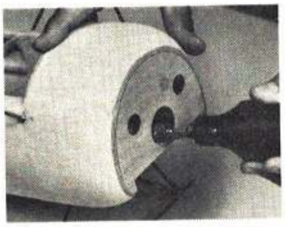

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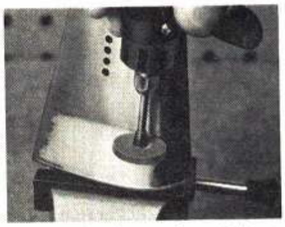

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Wing ribs are cut from six lb. C grain balsa, .020 x .032". Cut nine ribs for each wing. Be sure to use the higher camber ribs for the forward wing and lower camber for the aft. Rib templates can be cut from .020" brass shim stock.

Three compression ribs are needed for each wing. A rib form is cut out of poster board in the same manner as the wing form. One is required for the high camber and one for the aft wing lower camber. After the compression ribs are dry, lay out the pre-formed spars, compression ribs and regular ribs to form the wing inside the cardboard form. Glue all joints using a 50-50 mixture of Acetone and Aero-Gloss cement.

The complete frame is removed, layed out on a pine board, moistened with water and covered with your favorite microfilm.

Bracing technique is left to your personal preference, however the sketch on the plans should be followed to minimize the amount of bracing wire. A simple bracing jig is made and with the covered wing in it, the posts, cabane, and actual bracing can be accomplished. Wing bracing is done with .001 nichrome wire or .007 dacron monofilament available from Bud Tenny (Box 545, Richardson, Tex. 75080). Forward and aft wings are built in a similar manner; once completed they can be put in a box until the rest of the model is constructed.

Select a piece of .0115" C grain balsa for the motor stick blank. Cut to size and soak in warm water for a few

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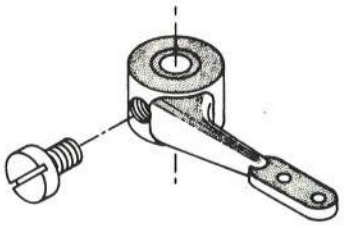

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minutes. Then wrap wet blank around a 1/4" mandrel using tissue strips to hold the shape. Bake the whole works in an oven for 30 min. at 175°F.

After the stick has cooled, remove the tissue and slide tube off the mandrel. The butt joint is carefully cemented along its length. A balsa web is added to each end and both ends are then capped.

A nose bearing is made from 2024 aluminum, .020 x 030 x 1". The rear of the bearing is split to form a "Y" so that the prop can be removed. Glue on a rear hook and brace it to prevent bending with a scrap .015" balsa wedge.

The tail cone is made in a similar manner using a tapered form. Only the back end (small end) needs to be capped, and it contains no webs.

The motor stick must be braced with .001 tungsten wire. Glue on the balsa Vs as shown on the plans. When dry, glue on the tungsten wire, add the tissue sockets in the locations shown, and the tail cone can be cemented on. Note the 1/4" offset in the tail cone.

A rudder outline is made by forming a piece of wet balsa .018 x .025" around a cardboard pattern, and baking in the oven. When dry, splice joint, cover with microfilm and glue to tail cone in the position indicated.

All the propellers used on the tandem have adjustable pitch. An aluminum hub is machined with a .063" ID and .070" OD. Length of the hub is 1/2". Each blade spar can then be plugged into the hub and cemented at the

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correct pitch. Propeller shaft material is .013 piano wire. This is pushed through a drilled hole in the hub, bent over and wrapped with thread, then glued securely.

One of the most important parts of any indoor model is the propeller. Care must be taken so that both prop spars flex equally. Spars are cut from 1/16" balsa of six lb. density. Two spars are cut 8½" long. The root is 1/16" square, tapering out to 1/32" dia. section for 1/2 in. so that it fits securely into the aluminum hub. Prop ribs are cut in the same way as wing ribs using a shim brass template. Cut 14 ribs out of .013" C grain balsa, 1/32" wide. The ribs are cut to length as needed. Both blades are made separately on the same block. Refer to Tom Vallee's article in AAM (January 1971, p. 35) for building the Bandersnap prop. When the blades are dry, remove them from the block and cover with film. The pitch can be set using a simple cardboard jig so that both blades are at the same angle. The adjustable pitch feature allows for a smooth running prop, and eases the task of matching the prop to a rubber motor.

The initial flight setup of the tandem is forward wing TE 1/8" higher than LE, and aft wing TE 3/16" closer to the tail cone than LE. The left panel of the forward wing has 3/16" wash-in built into it during the bracing operation and the left panel of the aft wing needs 1/8" wash-in. The aft wing in addition needs 1/2" tilt with respect to the forward wing, left panel up. The model CG, complete with motor, should be 8½" aft of the nose.

These adjustments will vary from model to model, but this is a reasonable starting point. Start with an 18" loop of well-lubed .048" Pirelli, and crank in 800 turns. Check the trim and adjust if necessary. Adjust the prop pitch so the model just cruises in level flight with about 950 turns. Full power is 2500 turns of the .048" rubber.

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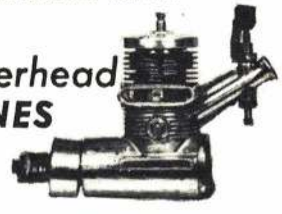

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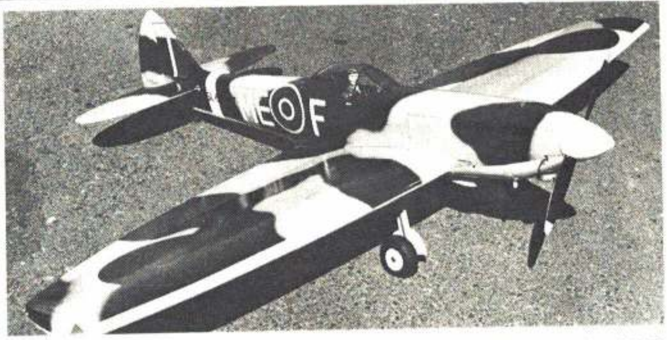

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AUTOPILOT PROJECT

(Continued from page 12)

Helicopters are fun but strangely are not suited to electrostatic autopilot in its present form. Helicopters need autopilot mostly for stability in hovering.

and therefore equal voltage planes or "shells" may be envisioned as surrounding the earth. This voltage varies vertically near the earth's surface at 100-150 volts/meter. The gradient diminishes at increasing altitude and varies as a function of the time of day and atmospheric conditions. It is distorted laterally by obstructions such as hills, trees, buildings, etc.

Much remains to be learned about this phenomena in terms of distortions and what limitations this may place on use of the electrostatic autopilot. We mechanize the electrostatic reference system by sensing voltage potential at each wing tip to provide roll information and potential of sensors placed longitudinally on the aircraft to control pitch. We connect the sensors to a two-channel differential amplifier and derive an error signal on the basis of a *differential* voltage between each pair of sensors. In other words, when the aircraft is level, a voltage difference between sensors is sensed and is When banked or pitched, a voltage difference between sensors is sensed and is processed through the amplifier and fed to the feedback control servos.

Mechanization of the system is not overly complicated and the circuit diagram shows one of the amplifier circuits that we have been using. This is a variation of Hill's circuit and eliminated the need for extra batteries since it operates on the normal 4.8 volt power supply of model radio control systems. Choice of the operational amplifiers (OP-AMPS) used will affect the cost of the systems considerably. The units shown should permit a parts cost of less than $50. We have one unit with mil spec OP-AMPS of good thermal stability that are considerably more expensive.

The sensors are manufactured by the Nuclear Products Co. (2519 N. Merced Ave., S. Elmonte, Calif.) and are 500 Micro-Curie polonium radioisotope units. We understand that another source is Nuclear Products (3M Co., Dept. BUB-122, St Paul, Minn.). These units are not harmful in normal use since the emission is very low energy alpha particles. The only caution is not to injest any of the radioisotope material. The alpha emission is easily stopped by thin materials placed over the sensor. This characteristic also permits using the

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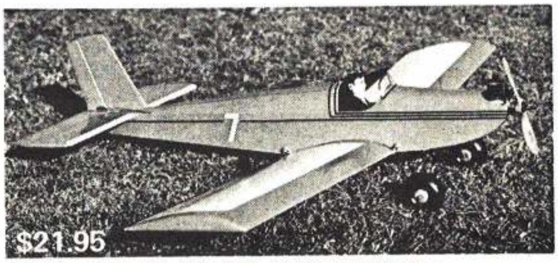

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feature to adjust sensitivity of the system by partial covering of the sensor with tape. Deposits of oil or other contaminants will also affect performance by reducing emission.

We have also found in our flight test that a smaller unit will work and we have flown successfully with a 200 Micro-Curie sensor. We believe that 100 Micro-Curies would also work, although this has not been flown. Suitable sensors of the same type may also be found in record shops as part of a brush assembly for cleaning records. The sensors are connected by fastening a wire to the shell or guard that protects the radioisotope strip. We found that connecting directly to the strip yielded primarily rate information; when connected to the shield, attitude information was derived. This is a phenomenon that requires further exploration since most aircraft control systems require a combination of attitude and rate sensing to function properly.

The autopilot has been flown in our project on six different aircraft. First tests were on aileron only in a Pilot *5-Star* plastic airplane. The system worked well right from the start with the sensors stuck to the wing tips with servo mounting tape. Some "trim" ef-

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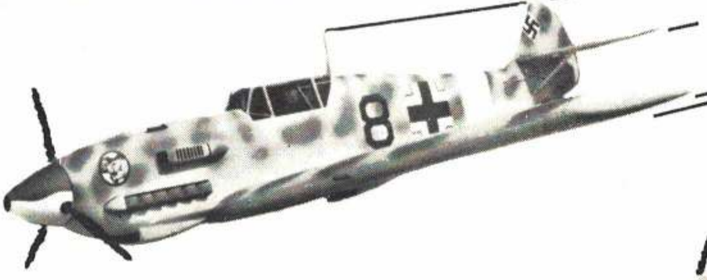

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fect was noted as a result of power change. This was always a right-hand turn with application of power. The aircraft rolled upside down on one takeoff with the autopilot on (we haven't explained this yet). Attempts to work out a suitable pitch sensor installation were unsuccessful on this aircraft. Several locations on the fuselage were tried without success. In each instance a large UP trim condition occurred which was beyond the control authority to recover without turning off the autopilot. Ground testing showed a strong pitch trim/engine speed relationship.

Ugly Stick: Since the plastic *5-Star* was disintegrating from vibration fatigue an *Ugly Stick* was pressed into service for autopilot testing. Pitch sensor installations were again found to be a problem with several locations on the fuselage being tried. In addition, a boom installation over and forward of the engine was tried with no success. Pitch trim was strongly affected by engine power. Recovery from pitch up maneuvers were very poor with either installation.

The largest improvement in the trim change phenomena occurred as a result of placing the pitch sensors on an arrowshaft boom located on the wing outside the prop wash. In fact we have had had satisfactory pitch performance only when this latter location is used, i.e., under the wing or the wing tip The *Ugly Stick* continued to show power/trim interaction but of a smaller more manageable magnitude with the latter installation. We were learning by this time, however, that static performance, i.e., picking the ship up and tilting it, had little relationship to flight performance other than direction of control motion.

The *Ugly Stick* in this configuration was flown many times and under different conditions. Flights were made in clear and cool, hot and humid, and light mist conditions. Hands-off landings have been made after adjusting pitch and roll attitude for landing. The bird was also flown at night using a small strobe light for tracking. Several flights were made in complete darkness with the only flight cues being the strobe light and sound of the engine. Takeoffs and landings were made in the light of automobile headlights.

This kind of flight is possible for two primary reasons: The control stick commands an attitude, so you *know* what the attitude is without looking at the ship; the control is limited with autopilot on, so full stick gives a gentle bank

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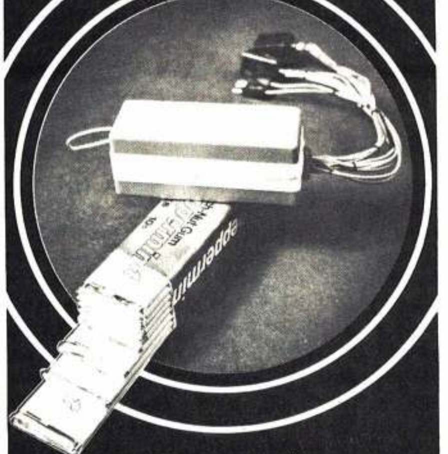

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or pitch control. An aircraft with an autopilot can be flown out of sight with only heading, altitude and azimuth information being required for proper navigation.

Additional experimentation with this aircraft to eliminate the trim/power effect was only partially successful. We theorized that the problem was due to charge stratification over the airframe surface and that this charge was a function of air flow over the aircraft as a result of flight or prop slipstream. We further theorized that bonding the ship together would tend to equalize the charge. So we placed aluminum metal tape along the fuselage, wing and horizontal tail, hooked the strips together electrically and to the autopilot ground. This seemed to help. We also suspected the charge developed on the prop, so we covered it with the same metal foil—this helped. With this setup we found that quick changes of power had no effect on trim. However, climbing to altitude and gliding with power off for two to three minutes and then re-applying power would show a large transient trim condition with trim stabilizing in a few seconds. One might reason that normal power on/power off trim will differ, however no such condition was evident with the autopilot off.

We believe that the tests prove that airframe surface charge is the offender and that its character is affected by flight conditions. The transient trim change noted in flight must be due to the charge readjusting in response to power on/power off.

Canard Test: In an attempt to test the influence of prop wash and exhaust gases on sensor performance, an installation was made in a canard previously designed and built by Maj. Ron Van Putte. This ship, the *Ascender*, was published in the April 1968 issue of AAM. The configuration permitted a test on an aircraft devoid of prop wash and exhaust gases influence. Results from several flight tests yielded disappointing results, however, in that the pitch trim effects continued with no improvement noted. An early demise of the ship due to battery failure prevented further teating.

Rudder Elevator Tests: An interest in autopilot application to Project *Praeire* led to tests on a modified *Big Daddy* which was rigged for rudder/elevator control. *Praeire* moments, areas and wing dihedral were approximated for the test. The aircraft was covered with MonoKote for expediency and we knew that this highly insulating material would give us the most difficulty in terms of effects on the sensors. Initial tests were very bad with large trim effects and difficulty in setting autopilot gains. We expected more difficulty in setting up a rudder controlled aircraft and we weren't disappointed. We changed our sensor installation to stand the sensors off the surface on lengths of arrow shaft. As set up, the roll sensors

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were mounted to four in. lengths of arrow shaft off the wing tips. The pitch sensors were mounted to a full-length arrow shaft (about 29") directly mounted horizontally to the wing tip. After several flights to adjust pitch and roll gains, this system worked beautifully with no trim effects noted. We could not set the roll gain as high as on an aileron controlled ship without getting into a yaw/roll coupled unstable condition. A suitable setting was found, however, for a nice smooth recovery from flight perturbations and this also yielded good "fly through" control.

The *Big Daddy* with a new wing with aileron roll control is now being used as a test bed for further autopilot tests. A *Sun Fly* was used for a few tests of a low voltage (4.8 volt) roll axis autopilot. After initial adjustments the system worked well, similar to the others.

Helicopter Tests: Our great desire to find if any advantage to RC helicopter flying was possible with the autopilot led to some quick tests on a Du-Bro Hughes Model 300 prototype helicopter. Dewey Broberg and Dave Gray of Du-Bro Products provided a bird and expert pilot help in these tests. An installation of pitch and roll sensors was made on lengths of arrow shaft fastened to the landing skids. In hovering tests no large trim effects were noted, although in the limited tests a perfect autopilot trim was not achieved before termination of the test. A change in the pitch sensor location to the body and tail boom proved very bad since a large pitch up on autopilot activation led to damage to the bird which terminated the tests.

We must count these tests as inconclusive at this point and further tests are planned. Some observations may be drawn, however, on helicopter use of the device. The ability of body mounted sensors to sense attitude and translate this into control inputs will depend on the nature of the rotor system and its coupling to the body. In any event, the electrostatic autopilot will not assure hovering over a spot but can only assist in keeping the bird level. A system of accelerameters would seem the most logical for "position" hovering. The autopilot will not handle the tail rotor control—a difficult chore in helicopter hovering. Autopilot assistance in pitch and roll should allow more concentration on the tail rotor and vertical flight, however, and ease these tasks accordingly.

We were concerned about the electrostatic charge on the whirling rotor distorting the field. This proved not to be a problem, however, in the installation tested. If the field were distorted it must have been equally so at all sensors, since no large trim effects were noted.

Praeire: The autopilot has been installed and flight tested on one of the aircraft *Praeire* project. Flight tests at aircraft weights of 60 and 90 lb. yielded good results once proper gain and trim adjust-

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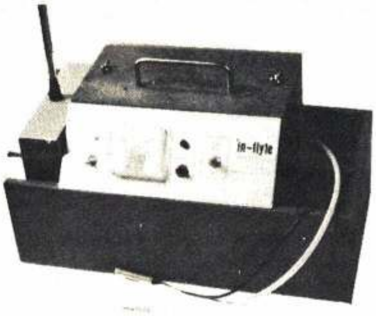

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ments were made. A sensor installation such as that on the *Big Daddy* was incorporated. Some difficulty with humidity effects on the amplifier were resolved by drying and using silica gel in the amplifier. A better solution would be moisture sealing of the board and components. Some right roll trim was noted and was countered by cut and try flight checks of left rudder bias. Once set up, several untrained individuals flew the craft with ease. This is the first prototype military system application of the electrostatic autopilot.

Other Experiments: We are presently developing a three-sensor, low-voltage amplifier that will have solid state switching and an independent inflight autopilot trim capability. In addition, we are working on a scheme which will allow normal autopilot operation with the transmitter turned off. Other experiments such as point-to-point preprogrammed flight is being considered. This could be mechanized as follows.

The two-axis system would maintain level flight. The craft would be steered via the rudder controlled by a magnetic heading device. Altitude would be commanded by vertically placed electrostatic sensors reading a potential or potential gradient. We are also interested in exploring the limits of the utility of the device in altitude, airspeed, weather, etc. These tasks would be performed with high performance aircraft.

Much experimental work needs to be performed with this autopilot concept. At this point we would draw the following conclusions from work that we have done:

(a) The system works and can be mechanized relatively inexpensively.

(b) The concept must be understood especially in terms of its limitations and influence of the airframe electrostatic charge.

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(c) It will not automatically make an unstable new design flyable. This is primarily true since the craft must be flyable without the autopilot functioning. A certain amount of cut and try is required to set up the autopilot on each new ship. Also for this reason an inflight autopilot on/off capability must be provided for initial setup and to accommodate other flight conditions.

(d) Control is limited with the autopilot on. The amount of control available is a function of the autopilot gain setting, i.e., a sensitive autopilot setting will give limited control. The more control available, the slower the autopilot will respond. In any event, for a reasonable autopilot gain setting, fly through control will be limited.

(e) It is not possible to perform aerobatic maneuvers with the autopilot turned on except in a limited way. An attempt to perform a loop will result in an Immelmann turn since the craft will roll out on top—it won't fly inverted unless the sensors are reversed. The limited control available will principally permit gentle turns, climb and descent. As with most autopilots, its principal purpose and utility is to automatically maintain the aircraft in straight and level flight or some other trimmed flight condition. The autopilot circuit diagram included in this article works very well with the World Engines servo design. It does not work equally well with the 72 series Kraft or Proline servos due to inability to tap in at a similar circuit point because of the IC chip design used. It should work alright with other discrete component servos. The higher voltage amplifier similar to Maynard Hill's which we have been flying works fine with the Kraft and Proline servos. I suggest that you read his article in *Flying Models* regarding this arrangement.

Summary: There is ample evidence that our aircraft hobby has come of age. When we witness projects such as *Teleplane*, Hill's autopilot concept *Praeire* and others, we see the major contribution that model aircraft technology has made. There are many other projects in government and industry presently drawing heavily on the same technology. Surely for this and many other reasons the aircraft hobby has to be one of the most challenging and satisfying hobby/sports available. The Teleplane Project is a very satisfying one since it is hardware oriented and permits rapid achievement of objectives. The Project needs additional qualified electronics and fabrication specialists. We are specifically interested in only Air Force military personnel who are skilled RC model builders or have strong electronic backgrounds. Contact may be made through AAM, or by writing Don Lowe, 3491 Clar-Von Dr., Dayton, Ohio 45430.

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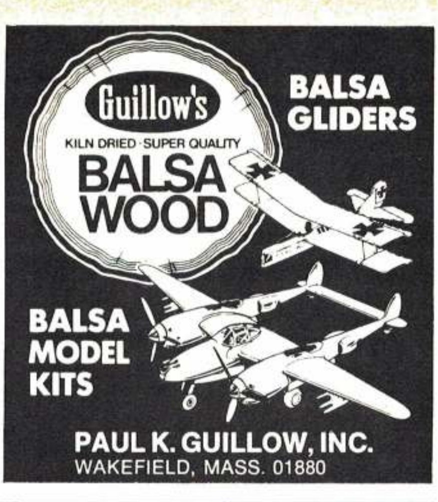

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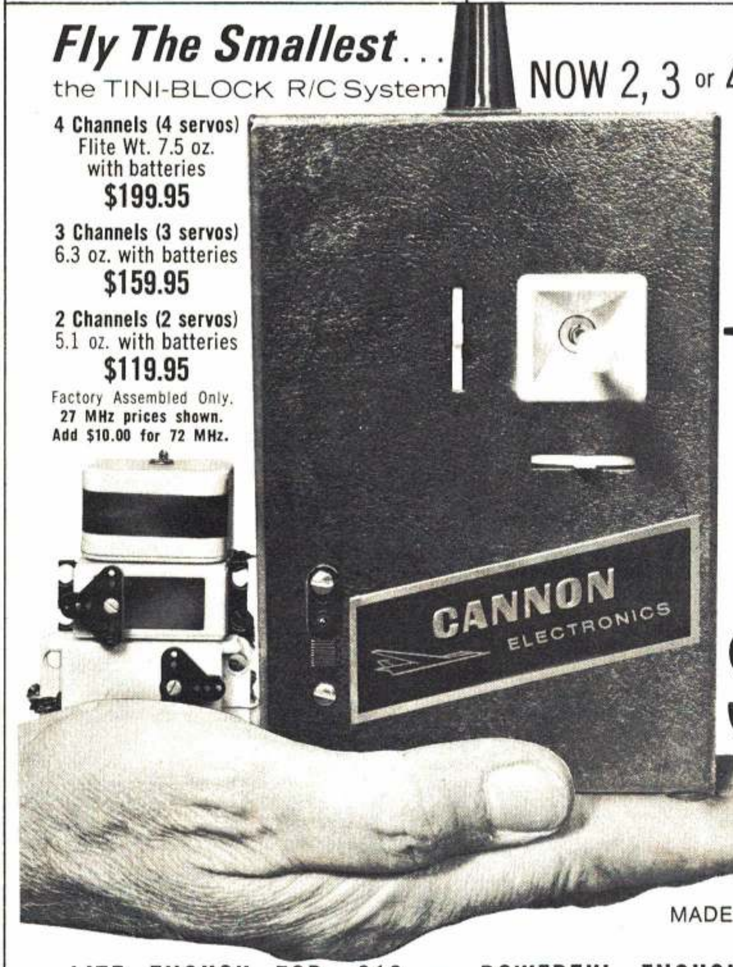

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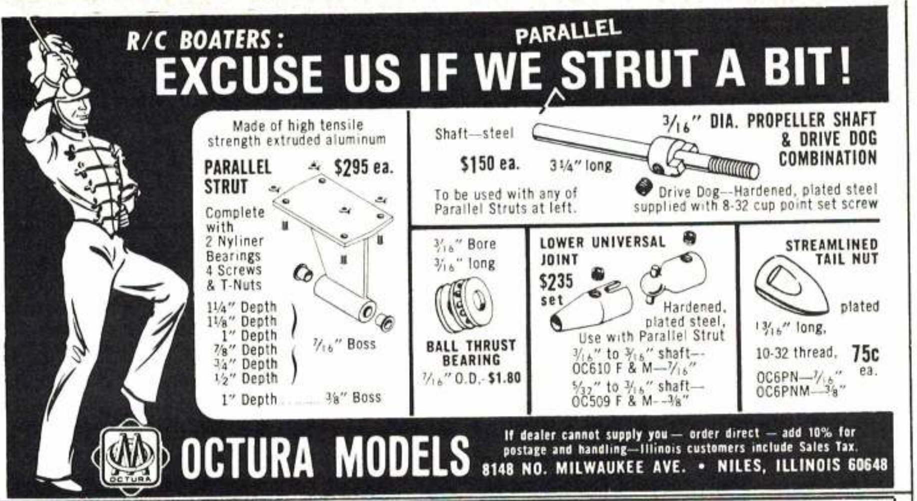

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OLE TIGER

(Continued from page 20)

The Ole Tiger is a very pretty plane. AAM published a Formula I version back in February, 1970. They both fly fast and smooth.

When a K&B 15 is used, it will be necessary to cut out section noted on plan in dotted lines after the assembly has cured. Sand assembly to contour shown on top view.

The basic fuselage sides are cut out to outline shown, stacked together, sanded true and the two 1/4 dia. holes are drilled. Cut slit in forward section as noted. Glue the 1/4 x 1/8" strips to upper and lower edge of the basic fuselage sides. The upper strip ends just aft of bulkhead 5 and the lower one ends aft of bulkhead 9.

Sand rear of sides to angles shown and glue together with bulkhead 9 in place. After curing, epoxy firewall assembly in place, align assembly using top view and clamp sides. Glue bulkhead 4 to 5. Place assembly on a flat surface, bottom side down and proceed to epoxy the landing gear, hatch mount 12 and 3/32" plywood aft hatch cross piece in place. Shim the mount and cross piece 1/16" off the building surface. Next, epoxy the assembled bulkheads 4 and 5 to fuselage sides and mount 12. The remaining bulkheads and bottom 1/4 x 1/8" cross pieces are now glued in place. The 1/8" sheet top turtle deck (cut to inside dotted lines) is glued in place and sanded flush with bulkheads.

The upper nose section from 1 back to 8 is now planked with 3/32" strips. Cut strips from a sheet in varying widths to meet your needs. The 3/32" sheet sides of the turtle back are now glued in place, and the assembly is left to dry. The inside of the nose section, forward of bulkhead 5, is now coated with epoxy and glass cloth. The upper 1/4" sheet turtle deck cap is now glued in place. The rear balsa fillets are formed by tack gluing two blocks to two 3/16" sheet spacers which take the place of the fin and stabilizer. This assembly is tack glued in place and left to dry. Rough sand planked area, rear of fuselage and fillet blocks, being careful not to round off edges where front cowl blocks are to be placed.

At this point the wing assembly begins with the two 1/4" dia. fiberglass shafts cut to 32½" length. Shafts can be obtained from sporting goods outlets or plastic supply houses in various lengths. Mark the locations of ribs and centerline on the shafts using a pencil or marking pen. Slide shafts in fuselage and place bottom of fuselage on a flat, true surface. Using two 2¼ x 6" (preferably 1/4" thick) sheet spacers, place under outer tips of the shafts. If shafts are out of line and do not lay flat on the

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spacers, enlarge holes slightly in fuselage sides until they lay flat and true without force being applied. Apply epoxy to shafts from inside of fuselage and let assembly completely cure.

Next, slide down ribs in proper sequence being *sure* that the top and front of the rib is correctly located. Lay a straightedge against the leading and trailing rib edges to assure proper location. Epoxy root rib to fuselage side, pin or tape to side of fuselage to maintain contour, and wipe excess epoxy from edges of rib.

Next, apply slow-curing epoxy to remaining ribs. To insure a true wing, rotate tip ribs back and forth until whole assembly will lay flat on spacers, without external pressure. Allow to completely cure.

Glue 1/16 x 1/4" front edge and 3/8" square rear edge in place. After it is dry, sand edges to meet contour of ribs.

The two wing skins, each consisting of three sheets of 1/16 x 3 x 36" medium balsa joined together with Francis resin, are now prepared. This isn't a difficult task if you select the sheets from a common bundle at the hobby shop, making sure the edges are not bowed or unusually rough. Match the sheet edges, sand as necessary for a good fit, and apply the resin to the edge with a pipe cleaner. Pin the sheets down on a flat surface covered with waxed paper and let cure. Sand both the top and bottom surfaces using a 280 grit paper.

(Continued on page 102)

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AMA 1972 Financial Report

New Membership Record Overcame Inflation

It was a worrisome year. Inflation boosted costs like never before–expenses for 1972 were almost $68,000 higher than in 1971. It was apparent early in the year that only if the then current membership growth rate continued would AMA be able to stay in the black concerning financial operations.

It had been predicted that 46,000 was the critical membership figure. Anything less would result in expenses exceeding income. As it turned out, the 1972 membership total came to almost 47,000, so a loss situation was avoided.

In fact the increase in membership produced a surplus of about $15,000, but this wasn't quite as healthy a situation as it might seem. Only a fantastic membership growth made the surplus possible–if that growth had been about 10% less, there would have been little or no surplus.

The situation in July of 1972 looked a lot less certain than it finally turned out. When AMA's Executive Council met at that time it was a toss-up as to whether enough additional memberships would be signed up during August and September to close out the year's membership records on a profit or loss basis. But regardless of that it was obvious that the situation would be worse in 1973.

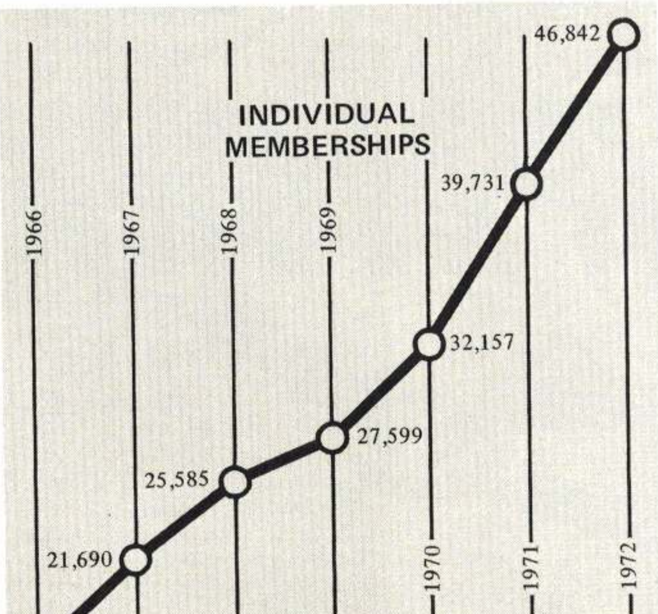
In two areas alone–publications and insurance–it was known that costs would go up considerably. And inflation was expected to increase all expenses by at least five percent. It was obvious, therefore, that a loss would be inevitable for 1973 operations unless AMA's growth rate kept on rolling along and/or a dues increase was put into effect.

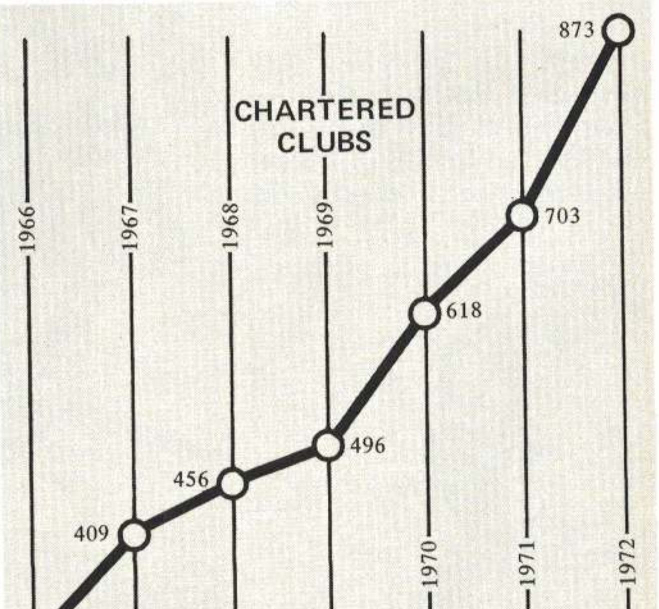
The council chose the safest course and approved a dues increase. In doing so, another element of risk was added in that the increase was substantial–much more than needed simply to hold the line. The council action reflected a desire to do more than merely keep up with expenses; it showed a determination to get AMA in a sufficiently strong financial position to be able to do many more things than had been possible in the past.

In particular the council action was in response to a general membership demand for more and better PR concerning model aviation. This is an area that serves the casual as well as the competition flyer. And since the non-competition flyers make up the vast majority of AMA membership, it was felt that spending more money in this area would provide the most benefit to all.

In February of this year the council met again and further emphasized the PR portion of the 1973 budget. After approving a 5% general budget increase to allow for inflationary trends, the council approved more than $80,000 in new expenses, including over $40,000 in new PR expenditures and $25,000 for HQ staff expansion.

The comparatively large increase in PR budgeting was made possible by the dues increase. It was obvious by mid-February that the dues increase had been well accepted by the membership, since renewals were running well ahead of the year before. This made it





At right with Top Flite P-51 Mustang, Leon Shulman, AMA L8, is one of the most famous modelers you'll find, having achieved a top competitor rating in virtually every kind of modeling—first Free Flight, then Control Line and Radio Control. Currently he's hard to beat in RC Gliders and old-time RC Free Flight in which he flies his original design Zomby of 1940-41 vintage.

He also has done more than his share of work for AMA and modeling, having been Contest Board chairman, district vice-president, and Contest Director of many meets including the Nats, Plymouth Internats, and the New York Mirror Meet, the latter which was the world's largest single-day meet.

Leon earns his living as manufacturer's sales rep for a number of firms in the model industry—Top Flite Models, Sullivan Products, DuBro, and others. He and his wife, Marion, are proud parents of four grown-ups: Adriane, Donald, Carol and Irene. Donald is an active modeler; Irene flies her own RC plane occasionally.

We proudly welcome Leon into the small but distinguished group of AMA'ers known as Life members.

possible to increase the PR budget without misgivings about the risk involved.

The fact that this could be done in February was in itself evidence of a better financial situation for AMA. Previously it was not known until about July whether AMA was likely to be in the red or black for the year. But the increased income from the new dues structure, plus a high rate of membership renewals, showed very early in the new year that sufficient income would be available to budget for new projects.

The net result has been earlier knowledge of our income situation and, thereby, earlier action to make use of the money available. This has eliminated much of the 'wait and hope' process of decision making, or the 'cross our fingers and go' gambles of previous years. In short, we know sooner where we stand about what we can do based on funds available. It's a lot more secure and efficient way of operating.

Note that the additional budget items for 1973 includes, for the first time, funds for film projects. This was a direct result of the success of AMA's first professionally produced film of the 1971 RC World Championships; the film cost was paid for by profits from the event. There is also an amount budgeted for legal counsel concerning FAA action. And, because we are going on our own in running the '73 Nats—the first time in 25 years without military support—there is a budget reserve for possible Nats assistance.

At the next Executive Council meeting (at the Nats in August) the year's operations will be reviewed again, with an eye on what to do for 1974. The 1973 budget currently anticipates a healthy surplus by year end, despite the areas of budget increase already mentioned. This surplus, plus that of former years, will add up to $50,000 or more.

How to use this surplus wisely will be a challenge to the council. The biggest need in model aviation today is for flying sites. Also there is a threat of FAA regulation of model flying activities. Both these areas can involve large expenditures, so the surplus offers the means to help solve the problems. The coun-

(Continued on page 96)

New Life Member Numbers Approved

In the July '73 AAM report of the AMA Executive Council meeting, one item was left out by mistake. This was the subject of a new numbering system for Life members, in order to provide more prestige recognition for this class of AMA membership. The proposal had been considered at the July 1972 council meeting but was tabled until the February 1973 meeting. It provided for the letter "L" to precede numbers in order of acceptance of such memberships. Thus, the first Life member would be assigned L1, and the others would follow in sequence.

Chilton, District IX VP, moved for approval of the proposal; seconded by Stalick, District XI VP. The voting was 11 for and 1 abstention; Frank, District VIII VP, abstained; all other VP's and the secretary-treasurer approved.

Here's how the numbers would be assigned to AMA's current list of Life members (and the year in which each became a Life member).

L1	Philip J. Baugh, Charlotte, NC	1963
L2	Jack G. Lowe (deceased)	1964
L3	Joseph P. Coles, Mt. Holly, NJ	1965
L4	Walter A. Wydler, St. Louis, MO	1966
L5	Jeremiah Courtney, Washington, DC	1968
L6	Matthew Sullivan, Willow Grove, PA	1968
L7	Ed Manulkin, Philadelphia, PA	1970
L8	Leon Shulman, Clark, NJ	1972
L9	Jim McNeill, Birmingham, AL	1973
L10	Francis Flinsch, E. Brunswick, NJ	1973

AMA has several groups of members who are called Life members. For example, past presidents and also Fellows automatically receive membership benefits and privileges without charge—they are, therefore, commonly referred to as "Life" members. But there is only one officially designated Life membership class, as originally defined by the Academy by-laws.

This class is very exclusive, for those who have made an exceptional financial contribution to AMA, in an amount of at least $1,000. Although this class of membership existed for many years, it was not until 1963 that the first such Life member, Philip J. Baugh of Charlotte, N.C., was registered. Mr. Baugh was joined the following year by Jack G. Lowe of Denver, Colo. Then Joe Coles of Mt. Holly, N.J., presented to President Howard Johnson a check for $2,000 at the 1965 Nats. And although Coles was already qualified doubly by this Life membership contribution, Joe presented another $1,000 in 1966! This same year also saw Walter A. Wydler, of St. Louis, Mo., become a Life member.

It is significant that these four Life members contributed at a time when Academy finances were in a serious deficit condition. No special recognition or publicity was involved—a genuine interest and concern for AMA's future was the common denominator of each of these Life memberships.

Since 1967, those who became Life members have had an advantage that those earlier did not enjoy. As a result of AMA's reorganization at the end of 1966, as a legally recognized non-profit corporation, contributions to the Academy are tax deductible.

HOW TO BECOME A LIFE MEMBER. The procedure is the simplest—send a check for $1,000 or more to AMA Headquarters! But there's another way.

For those who are inclined to support the organization beyond the basic membership dues, there are not many who are able to commit in a lump sum the $1,000 that a Life membership requires. By Executive Council action in 1969, on a proposal by AMA's legal counsel (who is Life member number five) it is easier to make a Life membership contribution. It is now possible to spread the $1,000 donation over a two-year period in three payments: a down payment, another payment a year later and a third payment two years after the first. This eases the financial strain at any one time and also provides tax benefits in three consecutive years. Our most recent Life membership, by Frank Flinsch, is being handled in this manner.

AMA Financial Statement—Year Ending December 31, 1972

Balance Sheet

Assets	
Current Assets:	
Cash/Checking Account	$290,071.63
Petty Cash	83.05
Cash/Savings Accounts	99,421.73
Accounts Receivable (owed us):	
Misc. Accounts Receivable	377.87
Advances/Employees	453.39
Nats Trophy Sponsorship	680.00
Nat'l. Assn. of Rocketry	1,975.50
Deferred Exp. (paid in advance):	
Prepaid Insurance	887.48
Magazine	26,468.41
Other	4,454.06
Supplies Inventory	2,806.48
1973 Membership Expenses	16,901.17
RC/WC Charter Deposits	4,978.40
Fixed Assets:	
Furniture & Equipment	28,898.00
Less: Depreciation Reserve	(13,976.35)
Total Assets	$464,480.82

Liabilities & Net Worth	
Current Liabilities (we owe):	
Accounts Payable	$15,135.85
Accrued Taxes	1,800.96
Employees' Escrow	2,682.69
Deferred Income (service due):	
Membership Dues/1973	358,522.42
Other	19,874.77
Program Entry Fees (in trust for team travel within U.S.):	
Free Flight	8,258.23
Radio Control	2,719.73
Indoor	1,870.25
Control Line	819.05
Scale, General	1,075.44
Other Funds (also held in trust):	
Scholarship Fund	7,283.60
RC/WC Fund, Net	721.37
Howard McEntree Fund	991.00
Net Worth:	
Balance, from 1/1/72, Adjusted	30,593.01
Income for year 1972	15,727.05
Scholarship Fund Allocation	(3,594.60)
Total Liabilities/Net Worth	$464,480.82

Expense Statement

Operating Expenses—by Department	
Membership	$151,596.69
Magazine	153,544.99
Supply & Service	8,473.66
FAI Programs	31,208.05
Contest Administration	19,622.00
Officer Services	7,525.95
General Administration	40,485.38
National Contest	59,716.29
Total—All Departments	$472.173.01

Operating Expenses—Detail	
Salaries & Payroll Taxes	$163,730.29
Rent	9,455.59
Telephone/Telegraph	4,613.20
Postage, General	24,341.76
Office Supplies	14,221.96
Public Relations, General	13,078.92
Travel/Trade Shows	2,614.76
Meetings	4,227.99
Insurance, General	2,591.33
Depreciation	2,371.39
Legal & Audit	1,624.80
Membership Supplies	28,786.51
Competition Newsletter	4,574.98
Rule Book	5,389.90
Insurnace, Membership	23,055.70
Supplies Sold, Cost	3,631.66
Magazine, Purchase	104,846.20
Postage	16,193.79
FAI: Team Expenses	5,731.05
Records (NAA Fees)	105.00
Franchise Fee	3,594.60
Miscellaneous	1,955.94
Nats: Hobby Shop	6,792.04
Trophies	5,125.63
Officials' Fees	5,460.00
Officials' Expenses	1,176.34
Navy Cleanup & Supplies	2,914.13
Helmets	285.65
Gen. Supplies & Misc.	2,106.02
Appreciation Activities	739.40
Officials' Cars	1,917.98
Equipment Rental	4,566.00
Uncollectible Accounts	352.50
Total Operating Expenses	$472.173.01

Income Statement

Operating Income—by Department	
Membership	$132,467.66
Magazine	182,554.00
Supply & Service	8,247.62
FAI Programs	39,719.00
Contest Administration	22,703.00
Officer Services	7,613.00
General Administration	38,066.00
National Contest	49,194.31
Total—All Departments	$480,564.59

Operating Income—Detail	
Membership Dues	$380,666.00
Sanctions (AMA, FAI meets)	3,669.00
Sanctions (FAI Records)	241.00
FAI Stamp Sales	1,412.00
NAR Insurance	1,925.50
Supply & Serv./Subscriptions	8,247.62
Mailing Services & Serv. Chgs	796.79
Club Charter Fees	22,390.87
Non-Charter Meet Fees	920.00
Competition Newsletter Subs.	11,101.50
Nats: Sponsorships	10,945.00
Hobby Shop	8,966.65
Entry Fees	21,473.80
Concession, Camping Fees	7,546.86
Other	262.00
Total Operating Income	$480,564.59
Less Operating Expense	472,173.01
Operating Gain	**$8,391.58**

Other Income	
Contributions/Booster Fund	208.50
Interest/Savings Accounts	7,126.97
Net Gain—1972	**$15,727.05**

Respectfully submitted,

John Worth

John Worth, Executive Director

Financial Report (continued)

cil's job will be to try to decide how much to spend and how to spend it in order to best benefit the membership.

It is not likely that the council will go too far in this direction in August—the Nats atmosphere is too hectic for careful planning. But the subject will be on the agenda, and a start will be made. This will be followed up during the winter meeting in early 1974. It appears, therefore, that this year will see the beginning of long range budgeting for projects which may ultimately determine how big model aviation will grow.

This is a dramatic change from budget problems of the past, when panic situations were typical. That change means AMA has survived its growing pains and now looks to working on solving some of the bigger problems that, previously, there was never enough time or money for. It's a challenge that we're in the best position ever to meet.

1973 AMA Budget Estimates

Income:	
Memberships	
3,000 at $7.50 (J/S w/mag)	$22,500
7,000 at $3 (J/S no/mag)	21,000
37,000 at $15 (O w/mag)	555,000
2,000 at $9 (O/family)	18,000
Contest Sanctions	3,500
Club Charter Fees	22,000
Competition Newsletter Subs	12,000
Interest	7,500
Total Income	$661,500

Expenses:	
NAA Affiliation	$3,700
Salaries & Payroll Taxes	196,300
Rent	9,500
Telephone	5,000
Postage	26,000
Public Relations	32,500
Film Projects	28,000
Mbr./Gen. Insurance	25,800
Depreciation	2,500
Legal, Audit	7,500
Membership Supplies, etc.	30,000
Publications, New Equip./Supp.	2,000
Competition Newsletter	5,000
Rule Books/Mbr. Manual	10,000
NAA Magazine	40,000
AAM Purchase	160,000
Postage	20,000
FAI Programs	12,000
Nats Reserve	10,000
Misc. Supplies/Expense	16,000
Total Expenses	$641,800

Receipts vs. Expenses:	
Gain	$19,700

(Assumes break-even operation for Nats, except reserve for possible loss.)

Nats 'n Sports 'n Nominations

PRESIDENT'S MEMO

THE 1973 NATIONAL MODEL AIRPLANE CHAMPIONSHIPS–AT OSHKOSH! Just saying "Oshkosh" is fun, so how can this year's championships miss! Shortly after this issue of "AMA News" appears, AMA will be smack in the middle of an exciting new adventure. We will be holding our first "country club" Nationals, and the first in 26 years without military (the NAVY) support.

Everything will be new and different except the MODEL AIRPLANES and the CONTESTANTS. The potential of fun, action and activities is limitless, and we know that in this first year we will just be able to plant the first cornerstones of tremendous future activity expansion. We are also aware that this wonderful new potential will bring us a mountain of new problems.

But all of the mountain of new problems will be overcome because modelers are the fine people they are, and will show that little extra helpfulness and patience, realizing our officials' problems. There is no group anywhere with more enthusiasm and ability to improvise than AMA'ers! There are a lot of things at this Nationals that we've never done before, but you can bet WE'LL DO IT GOOD!

"BELLYACHERS" PLEASE NOTICE–It only takes a few selfish self-centered gripers to spoil a lot of fun for a lot of nice people. And it takes the AMA contest officials just a few minutes of unpleasant contact with the "GRIPERS" to learn to hate the sight of them and tend to avoid them, which only prolongs the problem. PLEASE STAY OUT OF THIS UNSAVORY GROUP! You'll get FAR FARTHER in your cause with a smile. Remember that this is all supposed to be a sport. So YOU be a sport! If you let your hobby get you "up-tight" then perhaps you have let it become something besides a hobby.

Seriously, if WINNING is EVERYTHING to you, perhaps you'd better stay away from the NATS because, considering the number of entrants, the odds are already against you before you start. If you put FUN above all else and you enjoy good sportsmanship, then go to OSHKOSH and enter; who knows, you might win at least one of the more than 500 trophies. You know, there are a bunch of us who have no chance to win at all (the officials) but we'll be there and WE'LL HAVE FUN! SEE YOU IN OSHKOSH!

AMA President John Clemens

ELECTION TIME. About the time this issue will appear there won't be much time left for nominations to be presented for a lot of important AMA offices. All adult AMA members will vote this year for a national secretary-treasurer (office at present held by Earl Witt) and those in Districts I, III, V, VII, IX and XI will vote on their area vice-presidents. Since the vice-president of YOUR district is YOUR personal representative in the guidance of AMA, YOU SHOULD BE CONCERNED. Deadline for nominations for the mentioned offices will be previous to the Nominating Committee's meeting at the Nationals at Oshkosh during the week of August 6th.

The official nominating procedures, per AMA's by-laws, were published on page 107 of the June issue of American Aircraft Modeler Magazine, or a copy can be obtained from AMA Headquarters upon request. It is YOUR AMA, but if you show no interest in who your officers are, then you will have to put up with the decisions that result from the rest of us being interested!

THE AMA PRESIDENT'S SALARY. Of course the president of AMA, as with all AMA officials except the HQ staff, works for NO SALARY! The question of why anyone wants the responsibility is an interesting one. I know that there are many AMA'ers who have wondered, "What's with this Johnny Clemens knocking himself out as president, and at no pay?" I will have to confess that there have been many times when I have wondered this same thing. Of course most of the "work" side of my term in office is strictly of my own manufacture. It is because I see the office as one of responsibility and opportuntiy and not just one of honor.

A guy has to be some sort of a "nut" to work this hard for no reward! Just about the time that I begin to believe that, and get "tired", something special will happen that "squares" everything. Often the reward is in the form of a salute of an HONORARY MEMBERSHIP bestowed on me by one of our AMA clubs. I am sorry that the rest of you can't know the thrill of being so honored. To know that a whole club of your fellow AMA'ers appreciate your efforts enough that they would like to have you join them in membership, even if it can only be in spirit, is a pretty wonderful feeling, a real reward! And I am just the sentimental slob to be real touched and terribly proud at this recognition.

Of course, these honors obligate me to work STILL HARDER (smart move on your part!) and I find that I do just that.

Back to the president's salary–these honorary memberships are not negotiable at any bank, but they will fit beautifully into the lock-box of my heart and memory. To those who have so honored me, your gesture will be a savory part of the rest of my life, and I thank you so much!

YOU BE PRESIDENT OF AMA SOMEDAY, and you'll see what I mean. BUT BE A GOOD ONE!

John E. Clemens
AMA President

National Contest Late Entry Information

Most Nats contestants already will have entered by mail by the advance entry deadline of June 29. All others should take careful note of the fact that late entries can still be made, but only at the Nats in either of two places: on Sunday and Monday, August 5 and 6 at the indoor site (Brig. Gen. Richard L. Jones Armory in Chicago) from 9 am to noon and from 1 pm to 5 pm; also at Wittman Field, Oshkosh, Wisc., but only on Monday, August 6, from 1 pm to 5 pm and from 7 pm to 9 pm. The absolute deadline for late entries is nine o'clock on Monday, August 6.

A person who doesn't enter in advance and who is in danger of arriving late (after the 9 pm deadline on Monday) may have someone else enter for him. The only requirement, aside from the fees involved, is possession of the entrant's AMA card or payment for same (duplicate membership fees will be refunded by AMA HQ after the Nats).

LATE BASIC ENTRY FEE for Juniors and Seniors is $2 (same as advance fee, and includes entry in two events) and $25 for Open members (no events included). Event fees for late entries, or for events added at the Nats by advance entrants, are $3 per event for all age categories–except RC which are $7 per event. Note: no event additions permitted after 9 pm on Monday, August 6.

MECHANICS FEE, advance or late is $2; provides identification and field access privileges equivalent to contestants. Available to AMA members only; a Nats-only membership is included in the $2 fee for members of a contestant's family.

NATS HOUSING. The University of Wisconsin–Oshkosh, three miles from Wittman

Field in Oshkosh and Ripon College, 19 miles away, have made available a total of about 300 dormitory rooms to Nats contestants and officials. At the U of W, rates are $5 per person per night, two to a room, or $6 if one per room, while at Ripon the rate is $3 per person per night, mostly double occupancy. Whether any rooms will remain when this issue reaches readers is unknown. A telephone inquiry is suggested: (414) 424-3207 for Housing Office, AMA, University of Wisconsin; (414) 748-8164 for Richard J. Ronn, Director of Summer Conferences, Ripon College.

Over 500 campsites for tents and trailers are available right on the Nats outdoor site, Wittman Field, for $4 per day per site (irrespective of the number in the camping party). No electrical power to individual campsites, but camp area includes country store, toilets, roadways, night lighting, public telephones, showers, picnic tables, drinking fountains, evening movies.

NATS MEETINGS. The regular AMA membership meeting as provided by the AMA bylaws is scheduled to be held in the Open Air meeting building at Wittman Field on Wednesday at 6:30 pm; all members invited. The National Free Flight Society Technical Meeting will be on Wednesday while the NFFS General Meeting will be on Thursday–both in the Open Air meeting building, beginning at 8 pm.

The Nominating Committee, open only to AMA V.P.'s or their appointed delegates, will meet at 8 pm on Wednesday. The beginning of this meeting signals the closing time for AMA officer nominations (secretary-treasurer and vice-presidents for Districts I, III, V, VII, IX and XI) for the 1974-75 term. See page 107 of the June AAM for nomination procedures.

Also meeting on Wednesday are the Executive Council, 9 pm, and the AMA Contest Boards, 8 pm. These meetings are open, respectively, only to council members and A.V.P.'s, and to Contest Board members.

The RC Awards Banquet is planned for Saturday evening at 8 pm; check Nats bulletin board for location. Also check the bulletin board for time and place of the Old Timers' Banquet, other meetings, and for movies in the Open Air meeting building.

NATS ENTRY FORMS are available from AMA HQ, 806 Fifteenth St., N.W., Washington, D.C. 20005. When requesting an entry form, be sure to enclose a pre-addressed stamped envelope. It is suggested that the Nats entry form be obtained in advance by everyone who expects to enter, inasmuch as the form provides much more information about the contest that it is possible to print here.

Last-Minute Notes

ACCOMODATIONS. The Experimental Aircraft Association (now also known as the Sport Aviation Association) is having its annual Fly-In Convention at Wittman Field during the week before the AMA Nationals. Many AMA members may wish to attend at least a few days of the Fly-In before the start of the Nationals. If so, there will be an overlap problem concerning accommodations. Here's what to expect.

The Fly-In will begin to lose people on Friday, August 3rd. Some motel space may become available that night, and some dormitory space will probably be available. Ths situation will increasingly improve on Saturday and Sunday. But Saturday will be the last day of the Fly-In; on Sunday only a public air show is scheduled.

Accommodations could well be a problem, therefore, for anyone who wishes to see the Fly-In during mid-week before the Nationals; the best bet will be to camp at the site or to try to get dormitory accommodations. Close-by motel space is not likely–the Oshkosh motels are already booked solid for both the Fly-In and Nats weeks so that only if cancellations occur are nearby motel accommodations probable.

Open Air Meeting Building at Oshkosh in which many meetings will take place during the Nats.

OFFICIALS. Volunteer workers are expected to be needed at the Nats. An effort is currently underway to recruit such workers, but more are expected to be needed to replace last-minute drop-outs and to take some of the load from others. Anyone going to Oshkosh and interested in helping out should report to AMA Headquarters at Wittman Field. Or, if you can advise AMA in advance in Washington, please call before July 27–after that date the HQ crew will be on the way to Oshkosh. The AMA HQ phone in D.C. is (202) 347-2751.

The L.M. Cox Mfg. Co. has tentatively arranged for at least two dozen AMA Nats officials to be airlifted to Oshkosh from the West Coast, along with a planeload of Nats contestants and mechanics. Cox offered to sponsor the special airlift flight in support of the Nats operation. Other special transportation efforts were also underway, including the possibility of a chartered bus from the East Coast and various car pools from the South and Southwest. These special efforts are necessary due to the lack of military support for the '73 Nats–during the past 25 years a special Navy airlift transported officials from both coasts.

The Toledo Weak Signals RC Club of Ohio has helped make possible the continuance of the Nats RC judges program of recent years. This program utilizes judges from all parts of the country to provide a nationally representative and unbiased standard of judging. In the past such judges were flown to the Nats by Navy airlift and housed at no expense to AMA in Navy quarters. This year AMA is subsidizing both transportation and housing of all officials, including judges. The Weak Signals have helped by donating the proceeds of their annual raffle at the Toledo RC Conference–$1,133!

JUNIOR PROGRAMS. The Testor's Corporation, in cooperation with AMA, will be operating special Junior Programs at the 1973 Nationals. Included will be free flight gliders and rubber-powered models, plus the Fly 'Em series of ready-to fly control line models used at previous Nats. It was not certain at press time whether Delta Darts would be built and flown at the Nats this year–the Testor's Program may make this superfluous.

Regardless of that situation, however, there will be special Junior Programs at the Nationals this year. In addition to the above, the L. M. Cox Mfg. Co. was also expected to operate a special Nats program for youngsters as in past years.

SPECIAL ATTRACTION. A genuine Ford Tri-Motor transport plane (possibly two of them!) will be at Wittman Field during the Nats. Rides will be sold daily–last year they were $5 per person for a 15-minute scenic flight around the Oshkosh area; presumably the prices will be the same this year. It's a great way to see what flying was like in the good old days of aviation–the high-wing Ford also provides a great view.

Chartered Club officers who receive the AMA Monthly Mailing found out in June what was June's big modeling news. Did you? If not, ask your officers why not!

NEWS bits

Safety Cannot Be Saved

"Safety is a strange commodity. It is unlike anything else in this world. We can provide financial security for ourselves and our families by saving and investing our money wisely. We can insure our future health to some degree by good living habits and taking shots to immunize ourselves against many diseases. But safety cannot be accumulated over a period of time or provided for in the future. Every day is complete unto itself where safety is concerned."

The above was written by E.L. Conway, Trainmaster, Burlington Northern, published in the NSC Safety Newsletter and reprinted in Servo Chatter, newsletter of the AMA chartered Aerotelemechanics Club (Ill.), which was our source. Dick Vogt (AMA 10007), editor of the club's paper, added the thought that "it goes without saying that the same thing applies to our flying habits." Going on, he said, "Each day is complete unto itself, and the factors effecting safety are the individual, the plane and the conditions of environment at the time."

A.V.T.I. Impromptu Fun-Fly

"Looks like our new prez has a host of fun-and-games planned for us this year," started off a report in The Blow, newsletter of the AMA chartered Antelope Valley Tailwinds of Lancaster, Calif. The paper was talking about Bob Moorhead (AMA 79134) and his idea (approved by the club) for "The Impromptu Fun-Fly" to be held once a month at the club's field.

Here's how the idea goes. Each month the CD title, sole decision maker for that month's contest, is rotated among the membership. The CD of the month has the option of choosing any Saturday or Sunday for dropping in at the field and calling for an impromptu fun fly, requiring only five or more flyers who are willing to participate; then the fun fly begins. The contest consists of one simple maneuver to be flown just once by each pilot. The CD awards the winner a small prize–fuel, plug, box of rubber bands, etc.

How's that for variety and excitement!

Hobby Dealers–Clubs–Leaders: need AMA application blanks? For a free supply write to AMA HQ, 806 Fifteenth St., N.W., Washington, D.C. 20005. Specify how many are wanted.

To Those Who Work for It

The Mid-Arkansas Radio Control Society, Inc.'s (MARCS) PR efforts headed by club member Larry Hacker (AMA 76593) resulted in the publication of a great two page article and full color cover photo in Wings Over Arkansas, a monthly magazine "devoted to the best interests of private aviation in Arkansas and its surrounding area."

Hacker's article entitled "Head In The Clouds. . .Feet On The Ground" focused on the basics, advantages and various types of Radio Control flying, general club activities, weekend flying and AMA sanctioned contests. It also included an invitation to visit the MARCS' flying field in action and to request an airshow and/or model display which the MARCS "would be most interested in furnishing."

This type of PR is always needed but naturally requires real effort. In Hacker's words, "A 'good press' comes to those who work for it!" The MARCS and Larry Hacker are to be commended for a fine contribution.

Hijack Insurance

"With all of the airliner hijackings in recent years, the same thing was bound to spill over into model aircraft flying sooner or later."

The above paragraph from SCRAM Bulletin, was included in Sherman Meek's (AMA 5430) write-up of one such incident in Spartansburg, S.C. where one flyer found himself in trouble, caught between a strong wind and a new engine which had stopped suddenly. He managed to land safely about a quarter of a mile short of the runway, but when going to retrieve the plane, he found nothing.

"The story," reported Meek, "has a happy ending." The flyer had 100% homeowner's insurance coverage. The moral applies to all; "If you lose your model, check with your insurance man. It is suggested you check for deductible clauses before you decide to 'accidentally' fly away your old klunker."

Speakers Bureau

Within five months time the AMA chartered Meroke RC Club, Inc. (N.Y.) has shown off and talked about modeling to over 300 boys and parents at eight Boy Scout Troop meetings. Meroke member John Kaiser (AMA 1785), who headed the program, reasons that "all groups are on the lookout for interesting speakers and topics." thus the club's offers have invariably been welcomed.

According to the report in Smoke Signals, the club's newsletter, Bill Bauer (AMA 34869), Roy Long (AMA 65863) and Eric Quick (AMA 7004) did most of the lecturing. Subjects covered included building RC planes, world records, the problem of obtaining flying sites, AMA, and the Meroke RC Club, Inc. Static displays and question-and-answer periods were also featured. In addition to the discussions/lectures, those present were given an opportuntiy to work the RC controls and watch the planes respond–the most popular part of the 1½-2 hour programs.

Official Sanctioned Contests of the Academy of Model Aeronautics

JUNE 29-30–ANAHEIM, CALIF. (B) Orbit Invitational RC Helicopter Meet. Site: Anaheim Convention Center. J. Elliot CD, 19412. Olana Ln., Huntington Bch., Calif. 92646.

JUNE 30-JULY 1–CLEVELAND, OHIO (AA) 7th Annual Cleveland Aeromodel Sport CL Ra[illegible] [illegible] L Field. R. Sargent CD, 1694 Wright Ave., Rocky River, Ohio 44116. **CANCELLED**

JUNE 30-JULY 1–OKLAHOMA CITY, OKLA. (AA) TORKS Annual RC Meet. Site: TORKS Field. R. Freeland, Jr. CD, 7308 N. Western, Oklahoma City, Okla. 73116.

JUNE 30-JULY 1–CHATTANOOGA, TENN. (AA) 3rd Annual T.V.R.C. RC Meet. Site: T.V.R.C. Field. J. Wyatt CD, 502 Young Ave., Chattanooga, Tenn. 37405. Sponsor: Tennessee Valley RC Club.

JUNE 30-JULY 1–SYRACUSE, N.Y. (AA) Syracuse ARCS 2nd Annual RC Pattern Meet. Site: A.R.C.S. Field. W. Thorne CD, 208 Windemere Rd., Syracuse, N.Y. 13219. Sponsor: Aero Radio Club of Syracuse.

JUNE 30-JULY 1–ABILENE, TEX. (AAA) 5th Annual Key City Prop Twisters CL Meet. Site: Sea Bee Park. R. Patty CD, 1718 Highland, Abilene, Tex. 79605. Sponsor: Key City Prop Twisters.

JUNE 30-JULY 1–MANKATO, MINN. (AAA) Annual Midwest CL Championships. Site: Madison East Shopping Center. D. Nirk CD, 821 N. 2nd St., Mankato, Minn. 56001. Sponsor: Mankato Modeleers.

JUNE 30-JULY 1–MOWEAQUA, ILL. (A) Blunderbirds RC Thermal Soaring Contest. Site: Kroenlein's Airport. D. Holtfreter CD, P.O. Box 366, Blue Mound, Ill. 62513. Sponsor: Decatur Blunderbirds.

JULY 1–MENTOR, OHIO (A) MARCS FireCracker Class RC Meet. Site: Tyler Blvd. R. Penko CD, 21151 Westport Ave., Euclid, Ohio 44123. Sponsor: Mentor Area RC Society.

JULY 1–EDWARDSVILLE, ILL. East Side 2nd RC Fun Fly Jamboree. Site: Edwardsville. G. Shade CD, 3017 Maryville Rd., Granite City, Ill. 62040. Sponsor: East Side RC Club.

JULY 1–LOCKPORT, N.Y. (AA) United Pylon Racing Circuit RC Meet. Site: Lockport. R. Danilowicz CD, Creek Rd., Youngstown, N.Y. 14174.

JULY 1–LAKEHURST, N.J. Old Timers FF-RC Meet. Site: Lakehurst N.A.S. E. Woodman CD, 389 Floral Ln., Saddle Brook, N.J. 07642.

JULY 1–LIVINGSTON, N.J. (AA) Second Annual Flying Tigers CL Air Meet. Site: G.V. Controls. C. Schaefer CD, 514 N. Chestnut St., Westfield, N.J. 07090. Sponsor: Livingston Flying Tigers.

JULY 1–TULSA, OKLA. (A) Tulsa Glue Dobbers Spring RC Soaring Meet. Site: Oral Roberts University. D. Darnell CD, 1618 E. 45th Pl., Tulsa, Okla. 74105. Sponsor: Tulsa Glue Dobbers.

JULY 1–ELK GROVE VILLAGE, ILL. (AA) Skylarks Annual RC Meet. Site: Ned Brown Preserve. D. Gauer CD, 832 C Colonial, Wheeling, Ill. 60090. Sponsor: Skylarks.

JULY 1–CHAGRIN FALLS, OHIO (AA) Summer Old Timer FF Bash. Site: Chagrin Falls. R. Reuter CD, 4670 Columbia Rd., N., Olmsted, Ohio 44070. Sponsor: Northern Ohio FF Assn.

JULY 1–TREVOSE, PENNA. (AA) Flying Bucks All-Speed CL Meet. Site: Neshaminy Mall. R. Leishman CD, 167 Goldenridge Dr., Levittown, Penna. 19057. Sponsor: Flying Bucks of Levittown.

JULY 4–VINELAND, N.J. (A) 4th of July Annual CL Meet. Site: Lanois Park. P. Haley CD, Braddock Ave., RD No. 5, Hammonton, N.J. 08037. Sponsor: South Jersey Aeromodelers.

JULY 7-8–ALBANY, GA. (AAA) Georgia State FF, CL & RC Championships. Site: Albany N.A.S. H. Myers CD, 1565 Crider Rd., Apt. 34C, Marietta, Ga. 30062. Sponsor: Albany RC Club & Cobb County Sky Rebels.

JULY 7-8–KENT, WASH. (AAA) BMA Scholarship Contest-4th Annual FF, Ind, CL & RC Meet. Site: Kent Space Center. H. Smith CD, 1417 NW 191st St., Seattle, Wash. 98177. Sponsor: Boeing Charterhawks.

JULY 7-8–DAVENPORT, IOWA (AA) Davenport RC Annual Aerobatic Contest. Site: Scott County Park. J. Duda CD, 2205 Gaines St., Davenport, Iowa 52804.

JULY 7-8–LYONS, N.Y. 2nd Annual New York State Fly for Fun. Site: Layton St. Road. H. Ford CD, 11 Stephens St., Clifton Springs, N.Y. 14432. Sponsor: Sky Rovers Flying Club, Inc.

JULY 7-8–MONROE, N.C. (A) 1st Annual MR/CC Grand Glitch-In. Site: Monroe. B. Helms CD, 800 Tyvola Rd., Charlotte, N.C. 28210. Sponsor: Monroe RC Club.

JULY 7-8–SPRINGFIELD, MO. (AA) Springfield RC Club 3rd Annual AMA RC Contest. Site: Springfield RC Airport. G. Langston CD, P.O. Box 985, Springfield, Mo. 65801. Sponsor: Springfield RC Club.

JULY 7-8–OMAHA, NEBR. (AA) National Multiwing RC Championships. Site: Omaha. O. Olson CD, 6111 Maple St., Omaha, Nebr. 68104.

JULY 8–WESTMINSTER, MD. Aero Modelers Exposition. Site: Reese Fire Hall. R. Pease CD, 65 E. Main, Westminster, Md. 21157. Sponsor: Westminster Aero Modelers.

JULY 8–HEMPSTEAD, N.Y. (AA) Meroke 9th Annual RC Meet. Site: Mitchel Field. R. Geyer CD, 913 Washington St., Baldwin, N.Y. 11510. Sponsor: Meroke RC Club.

JULY 8–AUSTIN, TEX. (AA) Capitol Aeroneers June CL Contest. Site: Pending. J. Yesenik, CD, 408 Radam Ln., Austin, Tex. 78745. Sponsor: Capitol Aeroneers.

JULY 8–ST. LOUIS, MO. (AA) Pre-Nats CL Championships. Site: Buder Park. M. Heard CD, 11051 Mollerus, No. 101, St. Louis, Mo. 63138. Sponsor: Hot Heads Model Airplane Club.

JULY 8–SALINA, KANS. M.A.R.C.S. 1st Annual Fun Fly. Site: Old Municipal Airport. D. Moden CD, 410 Hart, Salina, Kans. 67401. Sponsor: M.A.R.C.S.

JULY 8–DENVER, COLO. (A) MMM Monthly FF (Cat II) Meet. Site: E. Colfax Airpark. J. Murphy CD, 2432 Astron Dr., Colorado Springs, Colo. 80906. Sponsor: Magnificent Mountain Men.

JULY 8–YORK, PENNA. York Area RC/ECSS Glider Meet. Site: York. D. Goughnour CD, RD 2, Red Lion, Penna. 17356. Sponsor: York Area RC Club.

JULY 8–DAYTON, OHIO (AA) Mid Summer Spectacular CL Meet. Site: Municipal Flying Circles. C. Short CD, 346 Lawver Ln., Dayton, Ohio 45431. Sponsor: Dayton

Buzzin Buzzards.

JULY 8—BUFFALO, N.Y. (AA) United Pylon Racing Circuit RC Meet. Site: Buffalo. H. deBolt CD, 49 Colden Ct., Buffalo, N.Y. 14225.

JULY 8—PORTLAND, ORE. March of Dimes Fun Fly. Site: Portland. R. Wright CD, 401 NE Bridgeton Rd., Portland, Ore. 97211. Sponsor: Barnstormers.

JULY 8—ODESSA, TEX. Odessa Prop Busters RC Annual Fun Fly. Site: Odessa RC Flying Field. J. Davis CD, 4405 Buffalo, Odessa, Tex. 79760. Sponsor: Odessa Prop Busters RC Club.

JULY 8—APPLETON, WISC. (A) Valley Aero Annual Meet. Site: Wijand. E. J. Schmieding CD, 2118 N. Division St., Appleton, Wisc. 54911. Sponsor: Valley Aero Modelers.

JULY 8—E. GRANBY, CONN. (A) NCRCC RC Pylon Race. Site: NCRCC Field. R. Bernier CD, 761 Mather St., Suffield, Conn. 06078. Sponsor: Northern Conn. RC Club.

JULY 14-15—FREMONT, NEBR. (AA) 1st Annual Frontier Flyers RC Meet. Site: Fremont. R. Stansbury CD, 9348 Camden Ave., Omaha, Neb. 68134. Sponsor: Frontier Flyers, Inc.

JULY 14-15—MENOMONEE FALLS, WISC. (AA) 3rd Annual Pre-Nats RC Warm-up. Site: Aero Park Airport. F. Morrissey CD, 14100 W. Park Ave., New Berlin, Wisc. 53151. Sponsor: Milwaukee Flying Electrons, Inc.

JULY 14-15—WALLOPS ISLAND, VA. (AA) "MARKS" 8th Annual RC Contest. Site: Wallops Station. H. Jones CD, 59 Aigburth Ave., Towson, Md. 21204. Sponsor: Mid-Atlantic RK Soc.

JULY 14-15—CHARLESTOWN, R.I. (AA) Southern New England RC Championships. Site: Charlestown N.A.S. A.M. Schindler CD, Bolduc Dr., Ledyard, Conn. 06339. Sponsor: RC Propbusters, Inc.

JULY 14-15—FARGO, N.D. (AA) 16th Annual Red River Valley CL Championships. Site: F.M. Skylarks Field. M. Olson CD, 305 27th Ave., N., Fargo, N.D. 58102. Sponsor: F.M. Skylarks.

JULY 14-15—ENDICOTT, N.Y. (AA) 18th Annual Aeroguidance Society RC Contest. Site: Tri-Cities Airport. W. Johnson CD, 833 W. Circle Dr., Vestal, N.Y. 13850. Sponsor: Aeroguidance Society, Inc.

JULY 14-15—HOUSTON, TEX. (A) Houston RC Soaring Meet. Site: Houston RC Field. B. Striegler CD, 5831 McKnight, Houston, Tex. 77035. Sponsor: Houston RC Club.

JULY 14-15—TULLAHOMA, TENN. (AA) Coffee Airfoilers 14th Annual RC Contest. Site: Airfoilers Field. C. Anderson CD, Rt. 4, Box 154, Tullahoma, Tenn. 37388. Sponsor: Coffee Airfoilers Model Airplane Club.

JULY 14-15—POCATELLO, ID. (AA) PGA 4th Annual CL Invitational Model Airplane Contest. Site: Highland High School. B. Diegel CD, P.O. Box 2307, Pocatello, Id. 83201. Sponsor: Pocatello Glue Angels.

JULY 14-15—BRYAN, TEX. (AA) Houston FF (Cat. II) Flynanza. Site: Bryan AFB. G. Simpson CD, 4327 McDermed, Houston, Tex. Sponsor: Houston Free Flight Club.

JULY 15—BLAINE, MINN. (AA) Annual Summer FF (Cat. II) Meet. Site: Hentges Sod Farm. L. Stockstad CD, 2648 Carlson Dr., Coon Rapids, Minn. 55433. Sponsor: Minneapolis Model Aero Club.

JULY 15—DANSVILLE, MICH. (A) C.A.R.D.S. 3rd Annual RC Soar-In. Site: Dansville. T. Kelley CD, 2929 Grandell Ave., Lansing, Mich. 48906.

JULY 15—MULBERRY, FLA. (A) Southeastern Sailplane RC Championships. Site: Imperial RC Club Mulberry Field. R. Meland CD, P.O. Box 886, Lakeland, Fla. 33803. Sponsor: Imperial RC Club, Inc.

JULY 15—FT. LEWIS, WASH. (A) 1st Annual Old Timers "Hot Lumber" Meet. Site: Harts Lake Prairie. D. Dodd CD, 10848 32nd Ave., SW, Seattle, Wash. 98146. Sponsor: Boeing Charter Hawks.

JULY 15—ST. LOUISVILLE, OHIO (AA) Licking County RC Meet. Site: A. Neithers Farm. A. Dupler CD, Box 186, Millersport, Ohio 43046. Sponsor: Licking County RC Club.

JULY 15—PIKE, N.Y. (A) Western New York FF Society FF Meet. Site: Pike. D. Evans CD, 175½ South First, Bolivar, N.Y. 14715.

JULY 15—TUCSON, ARIZ. (A) CCMAC Summer CL Slow Fest. Site: Rodeo Park. E. Hagerlin CD, 8331 E. 3rd St., Tucson, Ariz. 85710. Sponsor: Cholla Choppers M.A.C.

JULY 15—NAPERVILLE, ILL. (A) 1st Naperville CL Ralley. Site: Naperville. R. Vojslavek CD, 7819 Chestnut Ave., Woodridge, Ill. 60515. Sponsor: Fox Valley Falcons & Naperville Barnstormers.

JULY 15—HADLEY, MASS. (A) Hampshire County Grand Prix RC Air Races. Site: Hadley. Robert Dash CD, 333 Florence Rd., Florence, Mass. 01060. Sponsor: Hampshire County Radio Controllers.

JULY 15—DES MOINES, IOWA (AA) Central Iowa Aeromodelers CL Meet. Site: South East Hartford. R. Baldus CD, 6719 Colby, Des Moines, Iowa 50311. Sponsor: Central Iowa Aeromodelers.

JULY 20-22—LUMBERTON, N.C. (AA) 19th Annual RCNC Invitational RC Meet. Site: Lumberton. H. Randles CD, 3016 Marlborough Rd., Burlington, N.C. 27215.

JULY 21-22—TORONTO, CANADA. A, B & C Pattern & Standoff Scale Meet. Site: Markham Rd. & Finch Ave. D. Crichton CD, 119 Wildwood Cres., Toronto, Canada.

JULY 21-22—TULSA, OKLA. (AAA) Tulsa Glue Dobbers Annual No. 24 FF (Cat. II) & RC Meet. Site: Tulsa. R. Sewell CD, 9320 E. 3rd Pl., Tulsa, Okla. 74112. Sponsor: Tulsa Glue Dobbers.

JULY 21-22—COUNCIL BLUFFS, IOWA (AA) Cobras RC Pattern & Scale Meet. Site: Cobras Flying Field. D.K. Hutcheson CD, 317 Spencer Ave., Council Bluffs, Iowa 51501.

JULY 21-22—ALEXANDRIA, MINN. Golden Eagles Model Plane Club CL Meet. Site: West 17th & Ash Flying Field. C. Newstrom CD, 117 5th Ave., W., Alexandria, Minn. 56308.

JULY 22—OLEAN, N.Y. (AA) United Pylon Racing Circuit RC Meet. Site: Olean. B. Brown CD, 1255 High St., Bradford, Penna. 16701.

JULY 22—ELK GROVE, ILL. (A) RC Pylon Races. Site: Chicagoland. D. Swindell CD, 842 C Colonial, Wheeling, Ill. 60090. Sponsor: Chicago Pylon Club.

JULY 22—PLEASANTON, CALIF. WAFFC Fifth Annual Cat. II Meet. Site: Pleasanton. R. Douglas CD, 5303 Calderwood Ln., San Jose, Calif. 95118. Sponsor: Oakland Cloud Dusters.

JULY 22—WHEELING, ILL. (AA) Red Barons 3rd Annual CL Meet. Site: Wolf and Palatine Roads. H. Cain CD, 525 Weidner Rd., Buffalo Grove, Ill. 60090. Sponsor: Red Barons M.A.C.

JULY 22—MYSTIC, CONN. SAM-7 Old Timer Summer Outing. Site: Lantern Hill. J. Whittles CD, 43 Farview Ave., Saybrook, Conn. 06475. Sponsor: Society of Antique Modelers Chapter 7.

JULY 22—ELSINORE, CALIF. (AA) Thunderbugs Summer FF (Cat. II) Fling. Site: Lake Elsinore. J. Norcross CD, 4836 W. 123rd St., Hawthorne, Calif. 90250. Sponsor: Thunderbugs.

JULY 22—MANSFIELD, OHIO (AA) Electronic Flyers RC Pylon Races. Site: Mt. Zion Road. M. Kalish CD, 235 Cline Ave., Mansfield, Ohio 44907. Sponsor: Electronic Flyers.

JULY 22—HUNTSVILLE, ALA. (AA) MACH OT and FAI Meet. Site: Old Huntsville Airport. L. Baker, Jr. CD, 701 Esslinger Rd., Huntsville, Ala. 35802. Sponsor: Model Airplane Club of Huntsville.

JULY 22—CLINTONVILLE, WISC. RC Fun Fly. Site: City Airport. J. Vanderwalker CD, Rt. 3, Clintonville, Wisc. 54929. Sponsor: Clintonville Radio Control Club.

JULY 22—BRIGHTON, WISC. (A) Pelican's Summer FF (Cat. II) Combo. Site: Bong Field. R. Elman CD, 17707 Burnham Ave., Lansing, Ill. 60438. Sponsor: Pelican Model Airplane Club.

JULY 22—TULLAHOMA, TENN. (A) Airfoilers All Scale FF, CL & RC Ralley. Site: Airfoilers Field. L. Webster CD, 1000 Sycamore, Manchester, Tenn. 37355. Sponsor: Coffee Airfoilers.

JULY 23-25—LOCKPORT, ILL. (AA) Fourth Annual RC Soaring Nationals. Site: Lewis College. Advance entry required by June 30. D. Pruss CD, RR 2, Plainfield, Ill. 60544. Sponsor: Silent Order of Aeromodeling by Radio.

JULY 28-29—KNOXVILLE, TENN. (AA) ETRC's 2nd Annual AA Pattern RC Contest. Site: Knoxville. D. Bowman CD, 4723 Calumet Dr., Knoxville, Tenn. 37919. Sponsor: East Tennessee Radio Control Society, Inc.

JULY 28-29—MISSOULA, MONT. Blue Mountain 2nd Annual Fun Fly. Site: Missoula. G. Pew CD, 3708 North Ave., W., Missoula, Mont. 59801. Sponsor: Blue Mountain Aero Modelers.

JULY 28-29—MINNEAPOLIS, MINN. (AA) 17th Annual T.C.R.C. RC Meet. Site: T.C.R.C. Field. J. Duncan CD, 3835 Tonkawood Rd., Minnetonka, Minn. 55343. Sponsor: Twin City Radio Controllers, Inc.

JULY 28-29—GREENWOOD, S.C. 5th Annual Piedmont Fun Fly. Site: Greenwood County Airport. C. Boyd CD, 321 E. Boundary, Aiken, S.C. 29801.

JULY 28-29—FLOSSMORE, ILL. (AA) 6th Annual S.A.C. RC Meet. Site: Flossmore. J. Grier CD, 20824 Sparta Ln., Olympia Fields, Ill. 60461. Sponsor: Suburban Aero Club of Chicago.

JULY 29—FRESNO, CALIF. (A) F.G.M.C. Monthly FF (Cat. I) Meet. Site: Ave. 12, Road 37½. F. Ginder, Jr. CD, 5740 Ashlan Ave., Fresno, Calif. 93727. Sponsor: Fresno Gas Model Club.

JULY 29—HOUSTON, TEX. (A) MSCRCC 2nd Annual RC Soaring Meet. Site: Manned Spacecraft Center. O. Morris CD, 130 Driftwood, Seabrook, Tex. 77586. Sponsor: Manned Spacecraft Center RC Club.

JULY 29—LAKEHURST, N.J. (A) Monmouth M.A.C. Third Annual RC Soaring Meet. Site: Lakehurst N.A.S. R. Roane CD, 39 Monroe St., Keyport, N.J. 07735. Sponsor: Monmouth Model Airplane Club, Inc.

JULY 29—VALLEY PARK, MO. All Model Air Show. Site: Buder Park. R. Underwood CD, 4109 Concord Oaks Dr., St. Louis, Mo. 63128. Sponsor: Greater St. Louis Modeling Assn.

JULY 29—MUNCIE, IND. (A) 2nd Annual Muncee Skychiefs Fun Fly. Site: Club Field. G. Bussell CD, RR No. 7, Box 228D, Muncie, Ind. 47305. Sponsor: Muncee Skychiefs.

JULY 29—HADLEY, MASS. (A) Hampshire County Grand Prix RC Air Races. Site: Hadley. Bruce Sparrow CD, 418 Meadow St., Agawam, Mass. 01001. Sponsor: Hampshire County RC.

JULY 29—FRAMINGHAM, MASS. RC Glider Meet. Site: Callahan State Park. B. Fish CD, 17 Salmi Rd., Framingham, Mass. 01701. Sponsor: Charles River Radio Controllers.

AUG. 4-5—SALINA, KANS. (AA) M.A.R.C.S. 2nd Annual RC Meet. Site: Old Municipal Airport. D. Moden CD, 410 Hart, Salina, Kans. 67401. Sponsor: M.A.R.C.S.

AUG. 4-5—CHATTANOOGA, TENN. (A) 2nd RC Glider Meet. Site: T.V.R.C. Field. J. Wyatt CD, 502 Young Ave., Chattanooga, Tenn. 37405. Sponsor: Tennessee Valley RC Club.

AUG. 4-6—YORKTON, SASK., CANADA. Canadian National RC, FF and CL Model Airplane Championships. B. Reusch, Nats Corrdinator, 221 Roslyn Ave., Yorkton, Sask. S3N 1P3, Canada

AUG 5—DENVER, COLO. (A) MMM Monthly FF (Cat. II) Meet. Site: E. Colfax Airpark. B. Baldridge CD, 1464 S. Lafayette, Denver, Colo. 80210. Sponsor: Magnificent Mountain Men.

AUG. 5—E. BERLIN, PENNA. 3rd Annual York Area Fun Fly. Site: E. Berlin. D. Goughnour CD, RD 2, Red Lion, Penna. 17356. Sponsor: York Area RC Club.

AUG. 5—JAMESTOWN, N.Y. Flying Rebels Fly for Fun. Site: Club Field. E. Ecklund CD, 75 Benson St., Jamestown, N.Y. 14701. Sponsor: Flying Rebels.

AUG. 5—LOCKPORT, N.Y. (AA) 2nd Annual Western New York RC Jamboree. Site: Lockport. R. Danilowicz CD, 3245 Creek Rd., Youngstown, N.Y. 14174. Sponsor: Niagara County RC M.A.C., Inc.

AUG. 5—BREWSTER, N.Y. Gramby-Brewster First Annual RC Meet. Site: Flying Field Farms. D. Foster CD, 143 E. Main St., Chicopee, Mass. 01020.

AUG. 5-12—OSHKOSH, WISC. (AAAA) National Model Airplane Championships. Site: Wittman Field for outdoor events Aug. 7-12 (registration August 6); Brig. Gen. Richard L. Jones Armory, Chicago, for indoor events, Aug. 5-6. For entry form and full information, send pre-addressed and stamped (8 cent) envelope to AMA HQ, 806 15th St., N.W., Washington, D.C. 20005.

AUG. 8—BRIGHTON, WISC. Old Timers with RC Meet. Site: Bong Field. A. Thoms CD, 33 Cambridge Dr., Berkeley Hgts., N.J. 07922. Sponsor: Central Jersey RC.

AUG. 11-12—GREAT FALLS, MONT. Big Sky RC Modelers Fifth Annual Fun Fly. Site: Great Falls. B. Weed CD, 2325½ 2nd Ave., N., Great Falls, Mont. 59401. Sponsor: Big Sky RC Modelers.

AUG. 11-12—SALEM, OHIO (A) RC Short Circuits Soarama RC Meet. Site: Quaker City Dragstrip. J. Marshall CD, RD No. 5, Lisbon, Ohio 44432. Sponsor: RC Short Circuits, Inc.

AUG. 12—LINCOLN, NEBR. (AA) Aero Design 6th Annual Summer CL Meet. Site: Humane Society Park. D. Reiber CD, Rt. 8, Lincoln, Nebr. 68506.

AUG. 12—COLORADO SPRINGS, COLO. (A) Pikes Peak RC Fun Fly. Site: Colorado Springs. G. Hayhurst CD, 1219 Oswego, Colorado Springs, Colo. 80904. Sponsor: Pikes Peak RC Club.

AUG. 13—DELAVAN, ILL. Those Magnificent Men and their Sometimes Flying Machines Meet. Site: Fiske Field. D. Shipton CD, RR No. 2, Box 19, Delavan, Ill. 61734.

AUG. 18—PLYMOUTH, MICH. (A) Greater Detroit Soaring & Hiking Soc. Dual RC Meet. Site: Plymouth. E. Pell CD, 907 Medford Ct., Rochester, Mich. 98063. Sponsor: Greater Detroit Soaring & Hiking Soc.

AUG. 18-19—CEDAR RAPIDS, IOWA (AA) Sig's 2nd Annual RC Meet. Site: Seminole Valley Park. J. Finn, Jr. CD, 368 Hampden Dr., N.E., Cedar Rapids, Iowa 52402. Sponsor: Cedar Rapids Skyhawks RC Club.

AUG. 18-19—ROCHESTER, N.Y. (AA) United Pylon Racing Circuit RC Meet. Site: Rochester. R. Walder CD, 27 Folkside Ln., Fairport, N.Y. 14450. Sponsor: RC Club of Rochester, Inc.

AUG. 18-19—LAKEHURST, N.J. W.W. II Scramble RC Meet. Site: Lakehurst N.A.S. C. Gill CD, 835 Gilbridge Rd., Martinsville, N.J. 08836. Sponsor: West Jersey Radio Flyers.

AUG. 18-19—OILVILLE, VA. (AA) RARC 13th Annual RC Meet. Site: RARC Field. C. Foreman CD, RFD No. 4, Box 683, Mechanicsville, Va. 23111. Sponsor: Richmond Area Radio Control Club, Inc.

AUG. 18-19—E. GRANBY, CONN. (AA) New England RC Pattern Championships. Site: NCRCC Field. S. Griswold CD, Cottage St., New Hartford, Conn. 06057. Sponsor: Northern Conn. RC Club.

AUG. 18-19—WARSAW, IND. (AA) Sailplane Week-end RC Meet. Site: Warsaw. J. Kay CD, 903 E. Canal, Winona Lake, Ind. 46590. Sponsor: Warsaw Aero Modelers.

AUG. 18-19—OMAHA, NEBR. (AA) Omahawks Annual RC Contest. Site: Omahawks Field. P. Runge CD, 4617 Wakeley, Omaha, Nebr. 68132.

AUG. 18-19—CLARKSTON, MICH. (AA) PMAC RC Championships. Site: Clarkston. R. Pinner CD, 3955 Lotus Dr., Waterford, Mich. 48095. Sponsor: Pontiac Model Airplane Club.

AUG. 18-19—COLUMBIA, S.C. (AA) SC State RC Championships. Site: Hilton Field. W. Rivers CD, 1451 Bonner Ave., Columbia, S.C. 29204. Sponsor: Jackson Flyers Assn.

AUG. 18-19—TULLAHOMA, TENN. (AA) 14th Annual Coffee Airfoilers FF (Cat. II) Meet. Site: AEDC. A. Mansfield CD, 111 Iris Cr., Tullahoma, Tenn. 37388. Sponsor: Coffee Airfoilers M.A.C.

AUG. 19—QUEENS, N.Y. (AAA) Assn. Model Airplane Clubs of Greater N.Y. CL Meet. Site: Model Airplane Field. P. Bianchini CD, 260 S. Broadway, Yonkers, N.Y. 10705.

AUG. 19—SUAMICO, WISC. (A) Annual Summer A Pattern RC Meet. Site: Suamico Airport. R. Cowles, Jr. CD, 2424 Ducharme Ln., Green Bay, Wisc. 54301.

AUG. 19—WARREN, OHIO Skyhawks Third Annual Fun Fly. Site: Club Flying Field. M. Waggoner CD, Salt Springs Rd., Warren, Ohio 44481. Sponsor: Skyhawks RC Club.

AUG. 19—MESQUITE, TEX. (AA) 10th Annual Sun & Fun FF Contest. Site: Samuels East Park. D. Chancey CD, 322 LaSalle, Richardson, Tex. 75080. Sponsor: Cliff Cloud Climbers of Dallas.

AUG. 19—CINCINNATI, OHIO (AA) Queen City "August Action CL Contest" Site: Lunken Airport. C. Snyder CD, 11639 Timber Ridge Ln., Cincinnati, Ohio 45241. Sponsor: Queen City U-Control.

AUG. 19—MOUNDSVILLE, W. VA. RC Fun Fly. Site: Club Field. A. Blair, Jr. CD, RD No. 2, Box 383, Moundsville, W. Va. 26041. Sponsor: Valley I.F.O.'s M.A.C.

AUG. 19—LANCASTER, OHIO (AA) FORKS Annual RC Pattern Event. Site: F.O.R.K.S. Field. J. Slater CD, 809 Forest Rose Ave., Lancaster, Ohio 43130. Sponsor: Fairfield Ohio Radio Kontrol Society.

AUG. 19—ST. LOUIS, MO. (AAA) 15th Annual Midwestern CL Championships. Site: Buder Park Model Flying Field. A. Schaefer CD, 4206 Virginia Ave., St. Louis, Mo. 63111. Sponsor: St. Louis Yellow Jackets, Inc.

AUG. 19—ELSINORE, CALIF. (A) Picnic R.O.W. FF Scale Contest. Site: Lake Elsinore. C. Hatrak CD, 3825 W. 144th St., Hawthorne, Calif. 90250. Sponsor: N.A.R. Flightmasters.

AUG. 19—CLOVERDALE, ILL. (A) RC Sport Scale Meet. Site: Cloverdale. H. Mosquera CD, 361 N. Arrowhead Trail, Carol Stream, Ill. 60187. Sponsor: West Suburban RC'ers.

AUG. 19—ALBANY, ORE. (AA) 8th Annual NW FF (Cat. II) Championships. Site: Parkers Field. B. Stalick CD, 1120 Shady Ln., Albany, Ore. 97321. Sponsor: Willamette Modelers Club, Inc.

AUG. 19—BRIGHTON, WISC. (B) NIAMAC FF Meet. Site: Brighton. D. Hess CD, 137½ E. Lincon, DeKalb, Ill. 60115. Sponsor: DeKalb Cloud Dusters.

AUG. 25-26—POCATELLO, ID. (AA) PGA FF (Cat. II) Model Airplane Club Meet. Site: Outside Pocatello. T. Marcucci CD, 684 Willard, Pocatello, Id. 83201. Sponsor: Pocatello Glue Angels.

AUG. 25-26—MARIETTA, GA. (A) CCRC Southern RC Air Races. Site: CCRC Club Field. J. Harper CD, 900 Piedmont Cir., Marietta, Ga. 30062. Sponsor: Cobb County RC Club.

AUG. 25-26—SYRACUSE, N.Y. (A) Syracuse RC Soaring Open Meet. Site: Syracuse. F. Hogg CD, 232 Seneca Dr., Syracuse, N.Y. 13205. Sponsor: Aero Radio Club of Syracuse.

AUG. 25-26—ST. CHARLES, MO. (AA) McDonnell Sixteenth Annual RC Meet. Site: St. Charles. W. Feldmeier CD, 2955 Clearview Dr., Normandy, Mo. 63121. Sponsor: McDonnell RC M.A.C.

AUG. 25-26—ORANGE, MASS. 20th Annual New England RC Modelers Meet. Site: Orange Airport. W. Army CD, 15 Rhodes St., Millbury, Mass. 01527. Sponsor: New England Radio Control Modelers.

AUG. 25-26—ORWELL, OHIO (AA) 2nd Annual FF Rally. Site: Champion Field. J. Grega CD, 355 Grand Blvd., Bedford, Ohio 44146. Sponsor: Cleveland FF Society.

AUG. 25-26—CLEVELAND, OHIO (AAA) 38th Annual Cleveland Junior CL Air Races. Site: Cleveland Hopkins CL Field. R. Sargent CD, 1694 Wright Ave., Rocky River, Ohio 44116.

AUG. 25-26—KINSTON, N.C. (AA) KGAM Golden Leaf RC Tournament. Site: Kinston. T. Moore CD, 1907 Andrew Johnson Rd., Kinston, N.C. 28501. Sponsor: Kinston Greenville Aero Modelers.

AUG. 25-26—SALT LAKE CITY, UTAH (A) 12th Annual Summer RC Festival. Site: Saltair Modelport. D. Roper CD, 3914 W. 4955 South St., Salt Lake City, Utah 84118.

AUG. 25-26—MORGAN HILLS, CALIF. (A) West Coast RC Scale Championships. Site: Hill Country Air Museum. M. Groves CD, 791 Nisqually Dr., Sunnyvale, Calif. 94087. Sponsor: Pioneer RC Club.

AUG. 25-26—COURTLAND, ALA. (AA) Decatur M.A.C. 7th Annual RC Meet. Site: Courtland Air Base. J. Ray CD, 1304 Fletcher Ave., SW, Decatur, Ala. 35601. Sponsor: Decatur Model Airplane Club.

AUG. 26—EASTON, PENNA. (AA) FF (Cat. II) BAM Bash. Site: Easton Airport. R. Gutai CD, 334 West St., Bethlehem, Penna. 18018. Sponsor: Bath Area Modelaires.

AUG. 26—CHARDON, OHIO (A) C.R.C. 2nd Annual RC Glider Meet. Site: Chardon. F. Sheplavy CD, 36981 S. Lakeshore Blvd., Eastlake, Ohio 44094.

AUG. 26—NASSAU COUNTY, N.Y. (AA) Long Island Drone Society 15th Annual RC Pattern Meet. Site: Mitchell Field. T. Fiecco CD, 3989 Florence Rd., Seaford, N.Y. 11783.

AUG. 26—JAMESTOWN, N.Y. (AA) United Pylon Racing Circuit RC Meet. Site: Jamestown. W. Johnson CD, 62 Widrig Ave., Jamestown, N.Y. 14701.

AUG. 26—PLEASANTON, CALIF. AMPS/CME No. 2 FF Meet. Site: Pleasanton. R. Douglas CD, 5303 Calderwood Ln., San Jose, Calif. 95118. Sponsor: Oakland Cloud Dusters.

AUG. 26—MESQUITE, TEX. (A) The RC Glider Gaggle II. Site: Samuels Park East. R. Straw CD, 207 Leda Dr., Mesquite, Tex. 75218. Sponsor: Dallas RC Club.

AUG. 26—DAVENPORT, IOWA (AA) 16th Annual CL Model Meet. Site: Davenport Airport. R. Mairet CD, 3009 Westmar Dr., Bettendorf, Iowa 52722. Sponsor: Davenport M.A.C., Inc.

AUG. 26—FRESNO, CALIF. (A) F.G.M.C. Monthly FF (Cat. II) Meet. Site: Ave. 12, Road 37½. F. Ginder, Jr. CD, 5740 Ashlan Ave., Fresno, Calif. 93727. Sponsor: Fresno Gas Model Club.

AUG. 26—FRAMINGHAM, MASS. Fun Fly. Site: Callahan State Park. B. Fish CD, 17 Salmi Rd., Framingham, Mass. 01701. Sponsor: Charles River Radio Controllers.

AUG. 26—MORRIS, ILL. (A) Chicago Pylon Club RC Pylon Race Contest. Site: Morris Airport. G. Nelson CD, 23 Marie Dr., Downers Grove, Ill. 60515. Sponsor: Chicago Pylon Club.

AUG. 26—CANTON, OHIO (AA) 13th Annual Canton RC Meet. Site: Oyer Farm. J. Koontz CD, 3744 Grove Rd., NE, North Canton, Ohio 44721.

DIRECTORY OF AMA OFFICERS

HOW TO USE

Over 150 AMA members serve as volunteers on various committees which determine operating policies of Academy activities–many are listed here. Members are invited to communicate their comments, suggestions, proposals, or complaints by writing to the appropriate committee at any time. Note that the Executive Council and Associate Vice-President represent area interests for general AMA policy matters. Whenever district numbers are shown, write to the nearest address in your area. It is recommended that a copy of any correspondence be sent also to AMA Headquarters.

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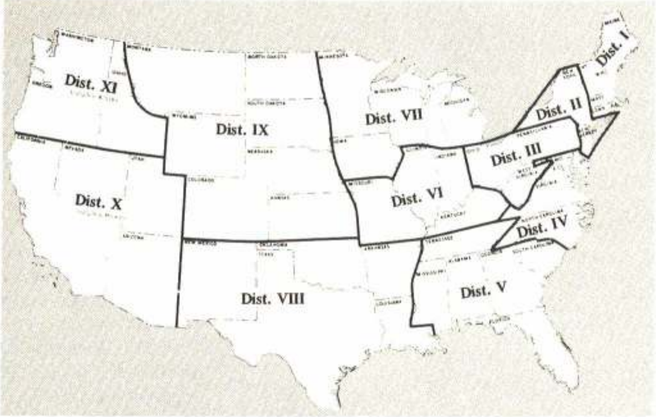

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OLE TIGER

(Continued from page 93)

The skin is now glued in place over the ribs and butted against the fuselage sides. Lay a straight piece of hard balsa on the front and rear edge of the shim, and use large clothespins to clamp in place. Remember that this whole process must take place with the two wing templates supporting the underside of the fiberglass spars to insure a true wing. After curing, remove the clothespins and apply the lower wing skins. At this stage, the wing assembly is rigid and only requires clamping in place during drying.

Sand the front, trailing edge and tip flush and glue the 3/8 x 1/2" leading edge in place. The trailing edge stock is now cut as shown. Route out the inboard section to receive the aileron torque tube assembly and, using five-minute epoxy, glue tube and trailing edge in place. Be sure not to get epoxy into torque tube during this assembly step.

Next, glue tips in place and apply ailerons to wings. I don't specify hinges because of the numerous types available, and each of us has his own preference. My only comment is to use enough to assure a strong assembly.

With the wing completed, we will now proceed to finish the fuselage. Epoxy a 1/16 x 1/4" plywood strip to the bottom and forward edge of the landing gear mount (12). Next, position formed landing gear on mount and drill two holes for 4-40 screws. Once drilled,

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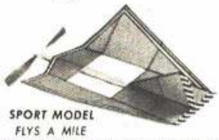

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place two 4-40 blind nuts on inside and screw down into mount. Glue the forward bottom 1/4" sheet in place. This sheet extends from bulkhead (1) to the leading edge of the landing gear opening.

Make hatch cover from 1/4" sheet and epoxy the two 1/16" plywood cross pieces as shown. Drill the three holes in mount and rear 3/32" cross piece and install 4-40 blind nuts. Undercut hatch to clear the two screw heads holding the gear in place and countersink hatch. Hold down screw openings. Fit nose blocks around engine mount and epoxy left cheek cowl in place. With engine mounted, make right cheek cowl from 1" thick balsa, route out section around engine, and extend to cooling opening. After fitting block, glue 3/8" sheet to complete cowl. After rough assembly is complete, epoxy nose ring R in place, leaving approximately 1/32" clearance between ring and nose spinner. Cut cowl aft of area assigned for 3/8" dia. dowel support. (Location noted for K&B 15 or Supertigre.) Epoxy dowel and rear of cowl assembly in place.

Epoxy a 1/16" plywood piece inside removeable cowl section where it butts against the dowel. Trim dowel so cowl fits flush. Drill hole through cowl into dowel and fasten with sheet metal screw. Fill in areas around wing and cowl with a mixture of micro balloons and Francis resin to form fillets, and completely sand assembly to contours shown.

Make tail surfaces from 3/16" medium grade sheet balsa and don't for-

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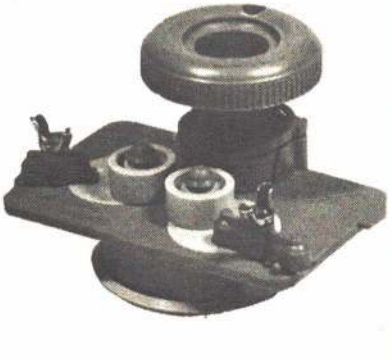

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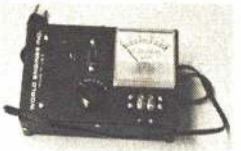

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get to use the spruce tips—these prevent warpage and insure against damage. Remove formed tail fillet assembly from fuselage and break away the two side fillets. Epoxy the hinged tail surfaces, tail-wheel bracket and fillets in place.

Make pants per detail sketch; shape and sand to finished contour. Install radio as noted, engine servo on plywood plate and three servos mounted on tray or directly to two 3/8" square maple cross pieces. After installation of pushrods, horns, etc., glue bottom of fuselage in place. I prefer leaving the bottom off to the last, to assure myself that the rods are free and not touching.

Each of has a preferred method of finishing. I used two coats of Francis resin sanded to a smooth finish and two overall coats of Hobbypoxy white sprayed on with an air brush. The trim is red Hobbypoxy and blue mylar tape for pin striping. The shield and racing numbers were cut from standard MonoKote. The emblems on the side of the fuselage, Bardahl, Champion etc., were purchased from the House of Balsa. They are mylar film with adhesive backing and are designed to take hot fuels and meet the scale size required. The tiger decal was made by spraying clear dope on the adhesive side of brown paper tape, hand painting the tiger and words, and then applying by soaking in warm water.

Full details and photos of the real aircraft can be found in volumes IV and VII of *Racing Planes* (Aero Publishing).

Flying

Check all controls and be sure balance point is as shown on plans. The surface movements should be as follows: Ailerons—3/16" up and down; elevator—3/16" up and down; rudder—3/8" right and left.

Have your helper hold aircraft, rev up engine and hold a little right rudder and a slight degree of up elevator. Upon release, and when model is tracking true, release right rudder and up elevator, until enough speed is reached for takeoff. The airfoil used in this model will allow you to turn as tight as possible without snapping, with very little drag at high speed, and still allow landings to be made at a very slow speed without fear of stalling. If so inclined, this is a great sport model and with a few added details it could do well in Stand-off Scale.

UPLIFT

(Continued from page 16)

for spectators. For example, at the Torrey Pines Soaring Meet, the Gulls were responsible for crowd control (it is estimated that from 5000 to 8000 spectators attended the two-day meet). In addition, TPG put on a static demonstration of model gliders, manned an information booth, and flew two demonstration flights each day. Last year, as a matter of recollection, the only planes that flew on the first day of the meet were those of the Gulls. It was too

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foggy in the morning and in the afternoon there wasn't enough lift on the cliff to fly an indoor model.

The shows put on for the crowd (incidentally, it was surprising how many of the full-size glider guiders stopped what they were doing to watch), included launches by high start and winches, a thermal duration contest between two Gulls and a two-min. duration with a spot landing. When the boys brought their planes in exactly on the spot, a round of applause showed the appreciation of the large group of spectators. Both the spot landings for the full-size and RC gliders were measured in inches and fractions to determine winners. Some of the Gulls also were involved in measuring for the full-size events of spot landing and the bomb drop. We feel that cooperation of this type can only cement relationships between the two clubs and help bring good public relations to the sport of soaring.

Three local soaring clubs, the Associated Glider Clubs of Southern California Ltd., The University of California at San Diego Soaring Club and the Torrey Pines Gulls, are working with the City of San Diego through its Park and Recreation Department and the University of California at San Diego in hopes of having the Torrey Pines Gliderport area designated as a permanent soaring park. Preserving the natural scenery of the cliffs and the historic heritage of gliding at Torrey Pines will ensure future generations the opportunity of enjoying the beauty of soaring.

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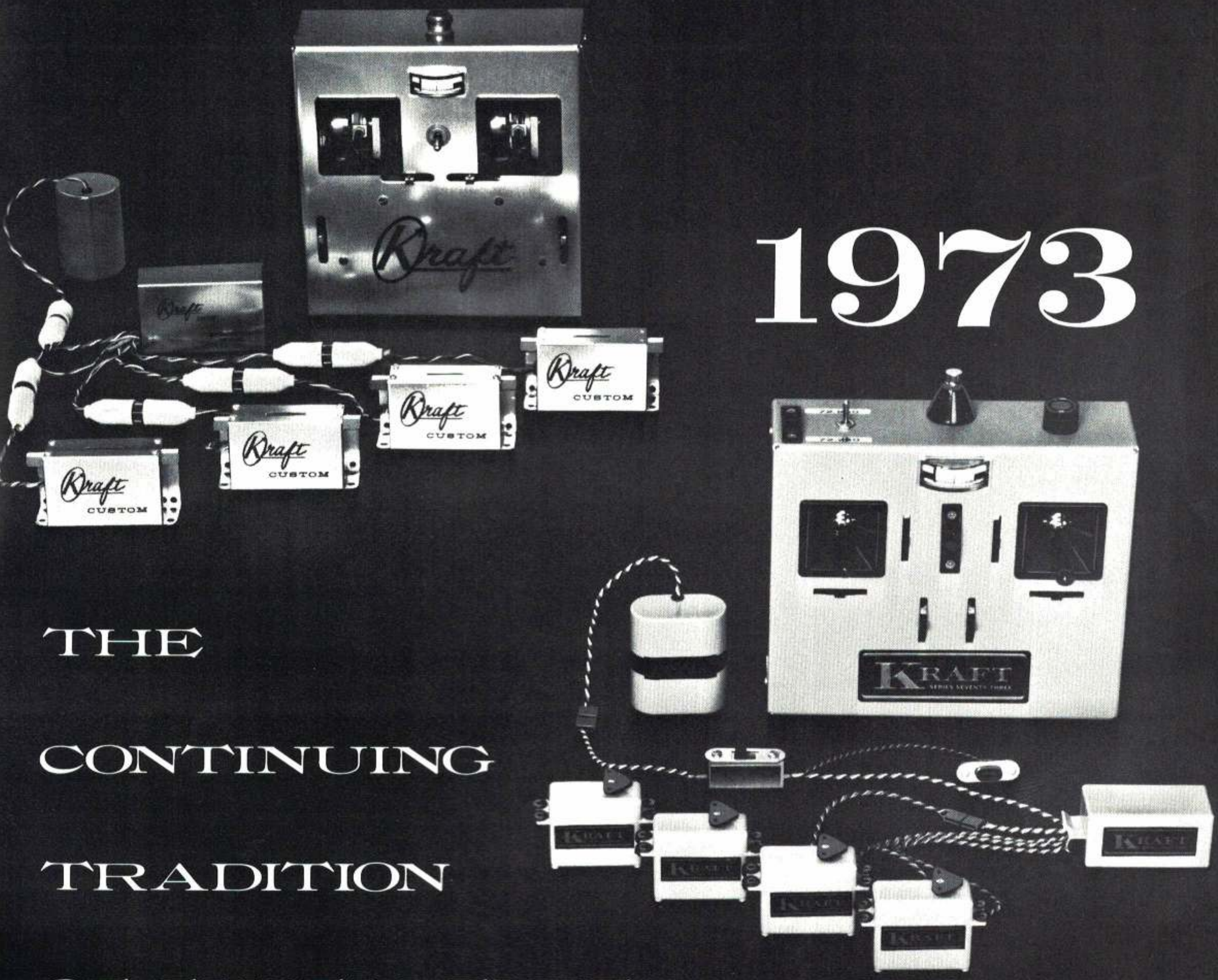

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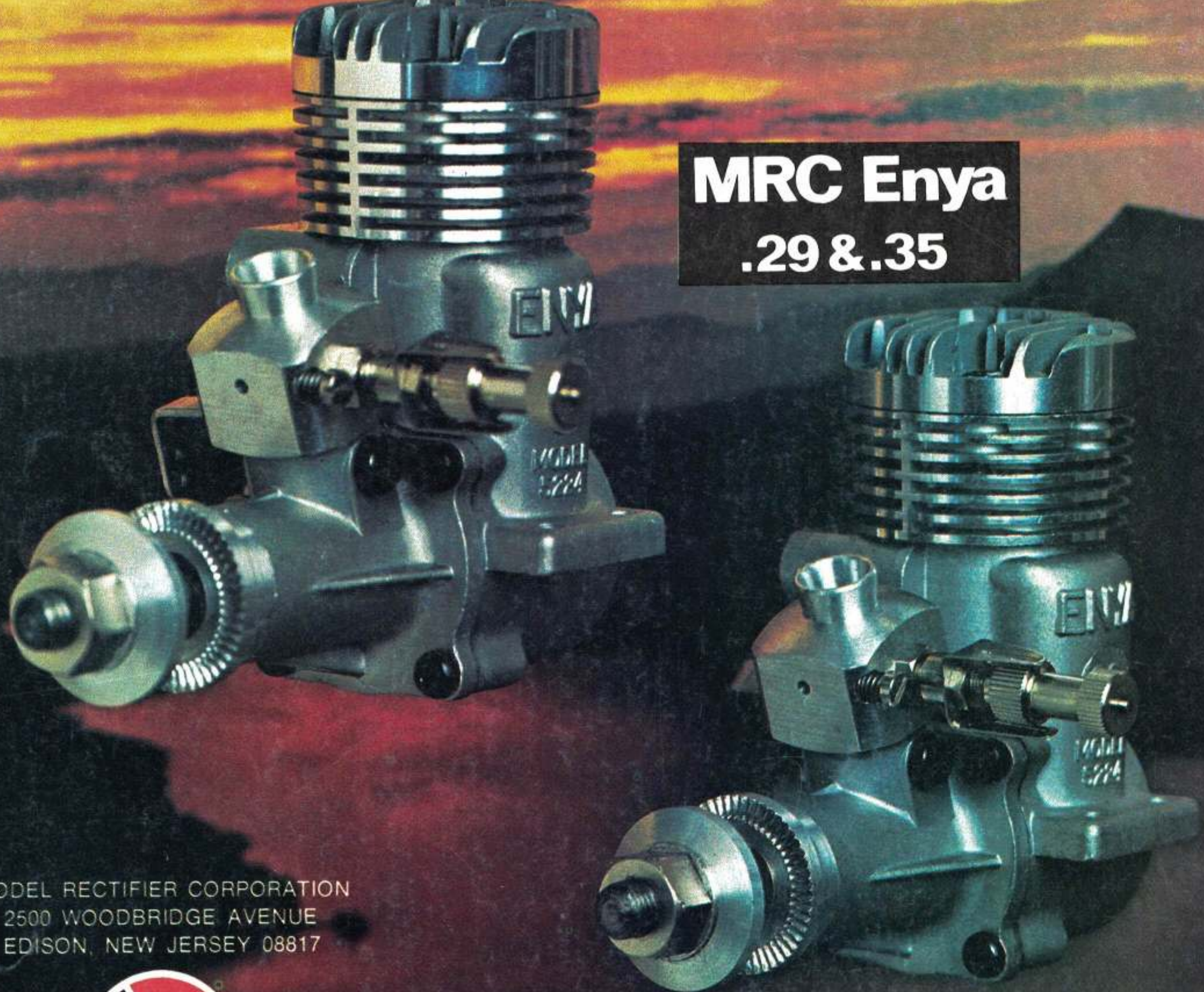

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